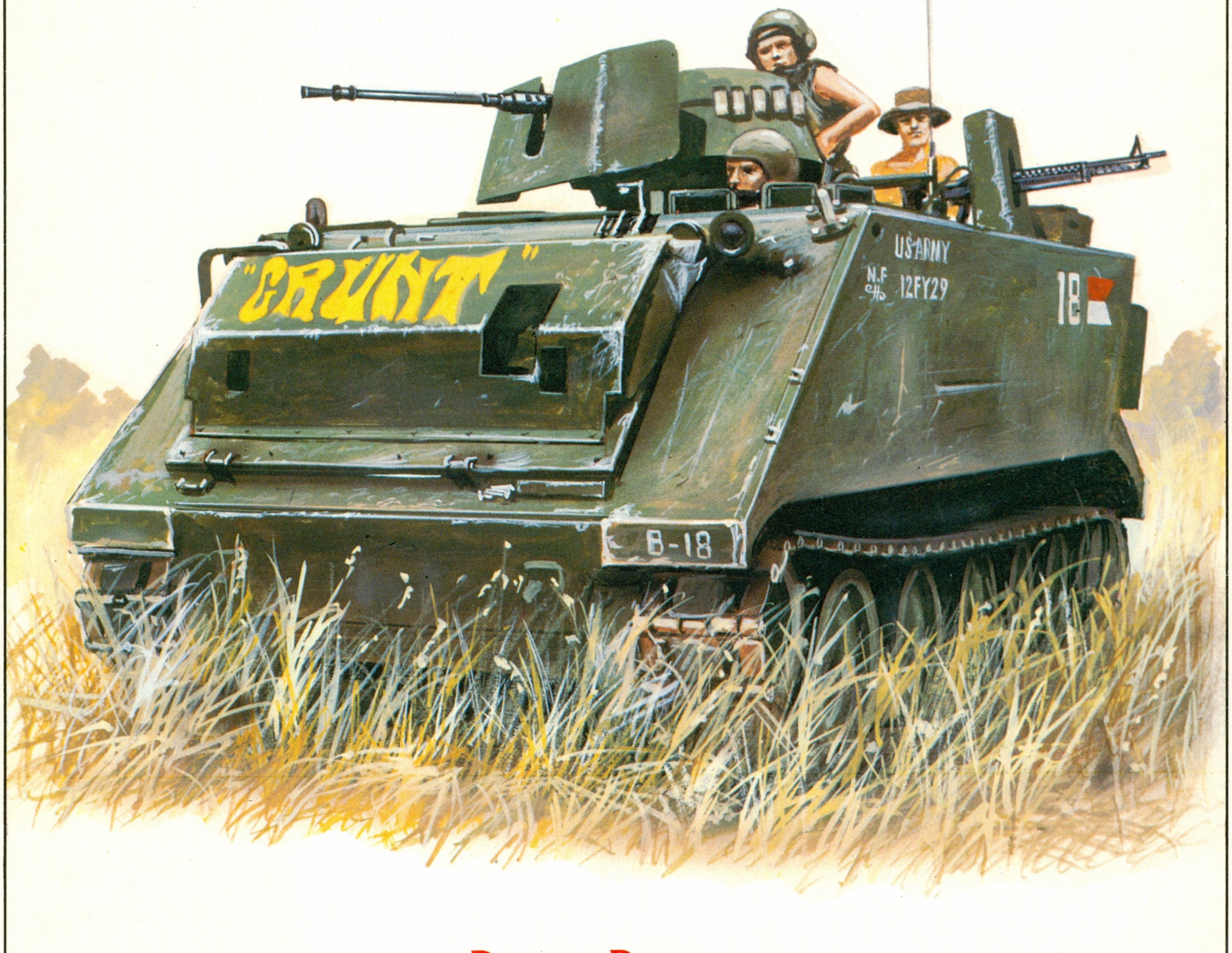
OSPREY · VANGUARD 38

MECHANISED INFANTRY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Bryan Perrett

Colour plates by Terry Hadler

VANGUARD SERIES

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MECHANISED INFANTRY

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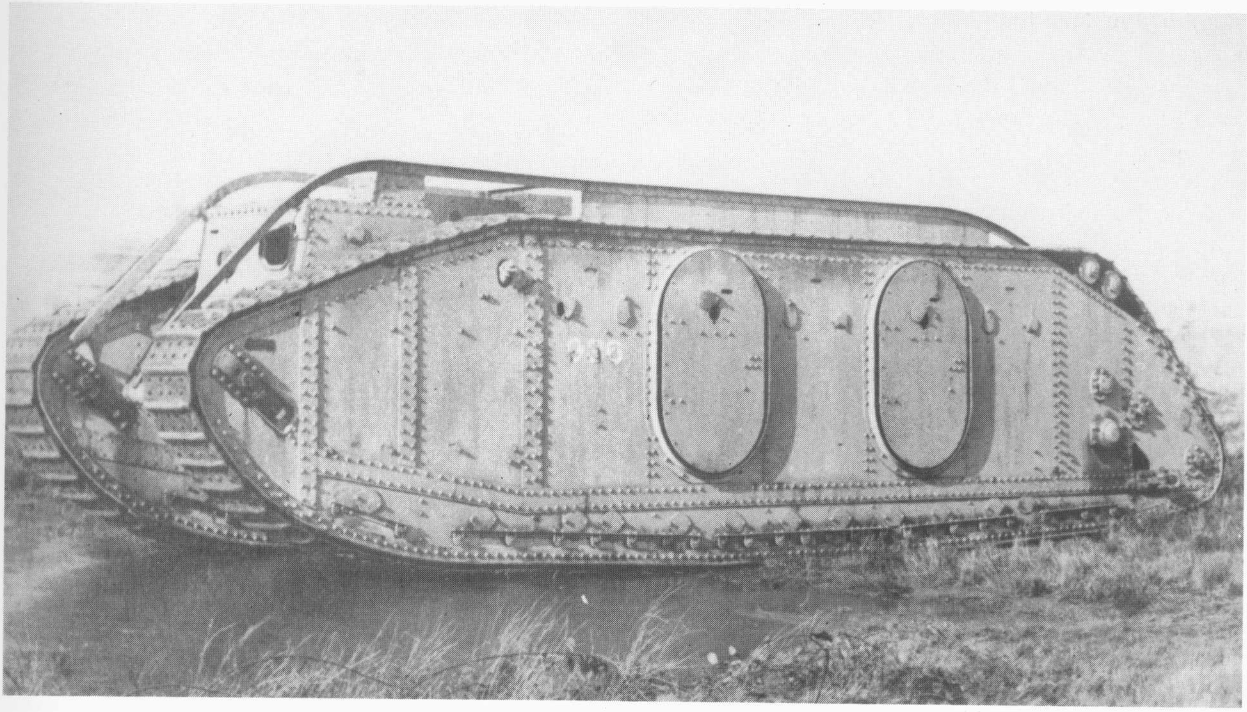


The Tank Mark IX, the world's first purpose-built armoured personnel carrier, was completed in October 1918—too late to see active service in the First World War. (RAC Tank Museum)

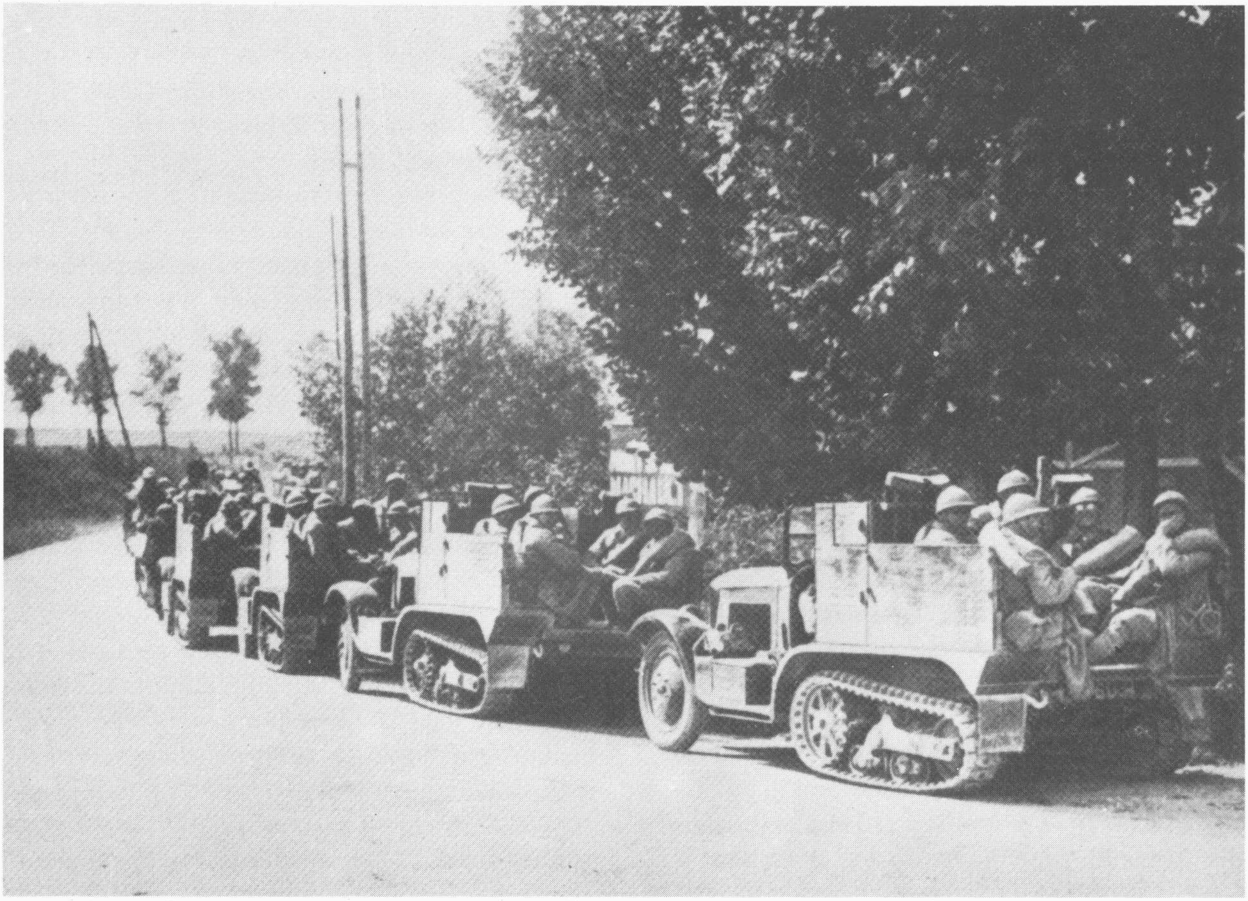
The Mounted Infantryman

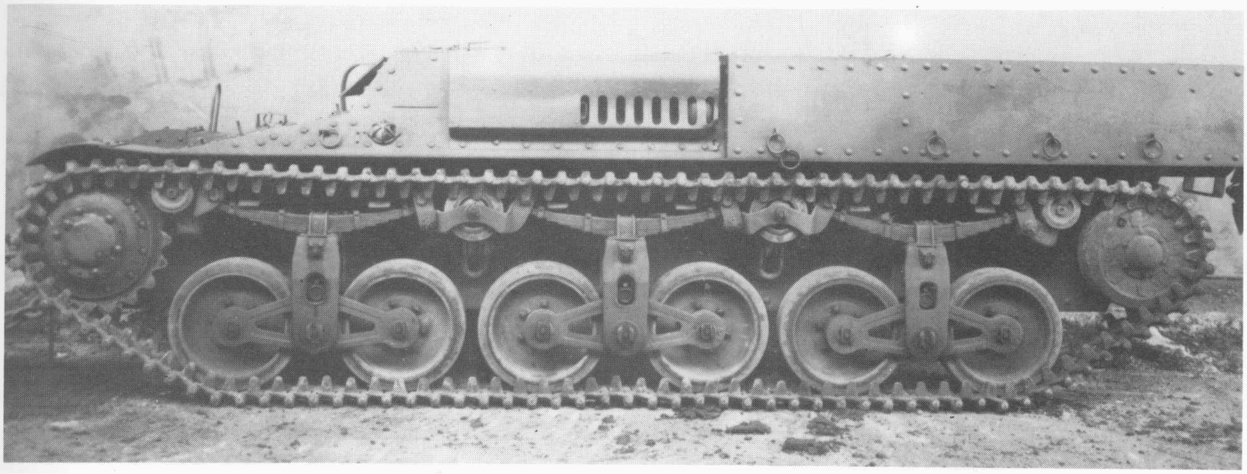
The theory of combining the firepower of infantry with the mobility of cavalry is, of course, as old as organised warfare itself. For many centuries the horse was too small an animal to be used effectively as a cavalry mount but, working in tandem with other horses, it was strong enough and fast enough to tow a chariot containing a driver and at least one soldier. The Bible makes it quite clear that the prestige of contending empires was reflected in the numbers of chariots each could deploy; and the rulers of the Fertile Crescent pointedly immortalised themselves in stone, hurling spears or shooting arrows from the platform of a galloping chariot. During his invasion of Britain Julius Caesar noted with interest that the enemy's chariots would be deployed against previously selected areas of the Roman battle line, their passengers dismounting to fight on foot; if the engagement went badly, the chariots would dash in to pick up the survivors. The technique clearly formed part of the Britons' established military philosophy and predicted, albeit in the most primitive fashion, the function of the APC. By now, however, the horse had long evolved to the extent that it was capable of carrying an armed rider and, as far as the Classical world was concerned, the war chariot was regarded as being somewhat *passée*.

It took a very long time indeed for the mounted infantryman to take his place on the battlefields of Western Europe. Such a concept was quite alien to the ethos of feudalism, implying as it did an element of democratisation, to say nothing of the strain on medieval exchequers. The advent of gunpowder, the Great Leveller, brought in its wake the need for professional standing armies; and the 17th century saw the first attempt to combine modern firepower with mobility in the form of a new class of soldier, the dragoon, who took his name from the type of musket he carried. The dragoon could be deployed rapidly, riding to the field of battle but fighting on foot. In England, dragoons fought in the Civil War, notably at Naseby in 1645; but perhaps the neatest example of their use took place at Preston during the Jacobite rising of 1715. The rebels had seized the town, but were badly led and had no idea that a brigade of dragoons was bearing down on them from the south. Using their mobility, the dragoons quickly got them boxed in among the streets, and then dismounted to launch a conventional infantry attack. They sustained the heavier loss but the rebels, surrounded and demoralised, surrendered, thereby putting an end to Jacobite hopes in England for 30 years.

This object lesson was soon forgotten, and as the 18th century progressed the British dragoon regiments simply became another branch of the heavy cavalry. The same was true of most Continental armies, although in the French service the dismounted role was theoretically maintained until the Napoleonic Wars. It was not, in fact, until the second half of the 19th century that the mounted infantryman began to come into his own, and the reasons for this were two-fold. First, as European dominance established itself around the world, the majority of wars were fought amid landscapes in which distances were vast and mobility a prime necessity. Secondly, increased defensive firepower meant that even cavalry fought more and more of their battles dismounted. During the American Civil War the cavalry of both sides relied more on their firearms than on their sabres, this mounted infantry tradition being maintained by the US Cavalry in its subsequent Indian wars. In South Africa the Boer farmer, who lived in the saddle and who relied on his skill as a marksman for survival, became the irregular mounted infantryman *par excellence*, defeating regular British troops in 1881 and again in 1899. Their success can be gauged by the fact that it took the better part of three years for the British Empire to suppress an enemy who was never able to field more than 40,000 men. Indeed, it was not until the British began creating mounted infantry battalions of their own, using them to drive the elusive commandos towards painstakingly constructed blockhouse lines, that the Second Boer War could be brought to a conclusion; significantly, the Dominion cavalry

French *Dragons portées* riding in Kegresse half-tracks during an exercise held in the 1920s. (ECPA)





The *Tracteur Blindée 38L*, otherwise known as the Lorraine General Purpose Carrier, entered service in 1937 and was used by French mechanised infantry units during the campaign of 1940. Its suspension influenced that of the American M4 Sherman medium tank, and captured chassis were used as the basis for several German self-propelled weapon systems. (RAC Tank Museum)

regiments, less inhibited by tradition, were already trained as mounted infantry rather than for shock action in the European manner.

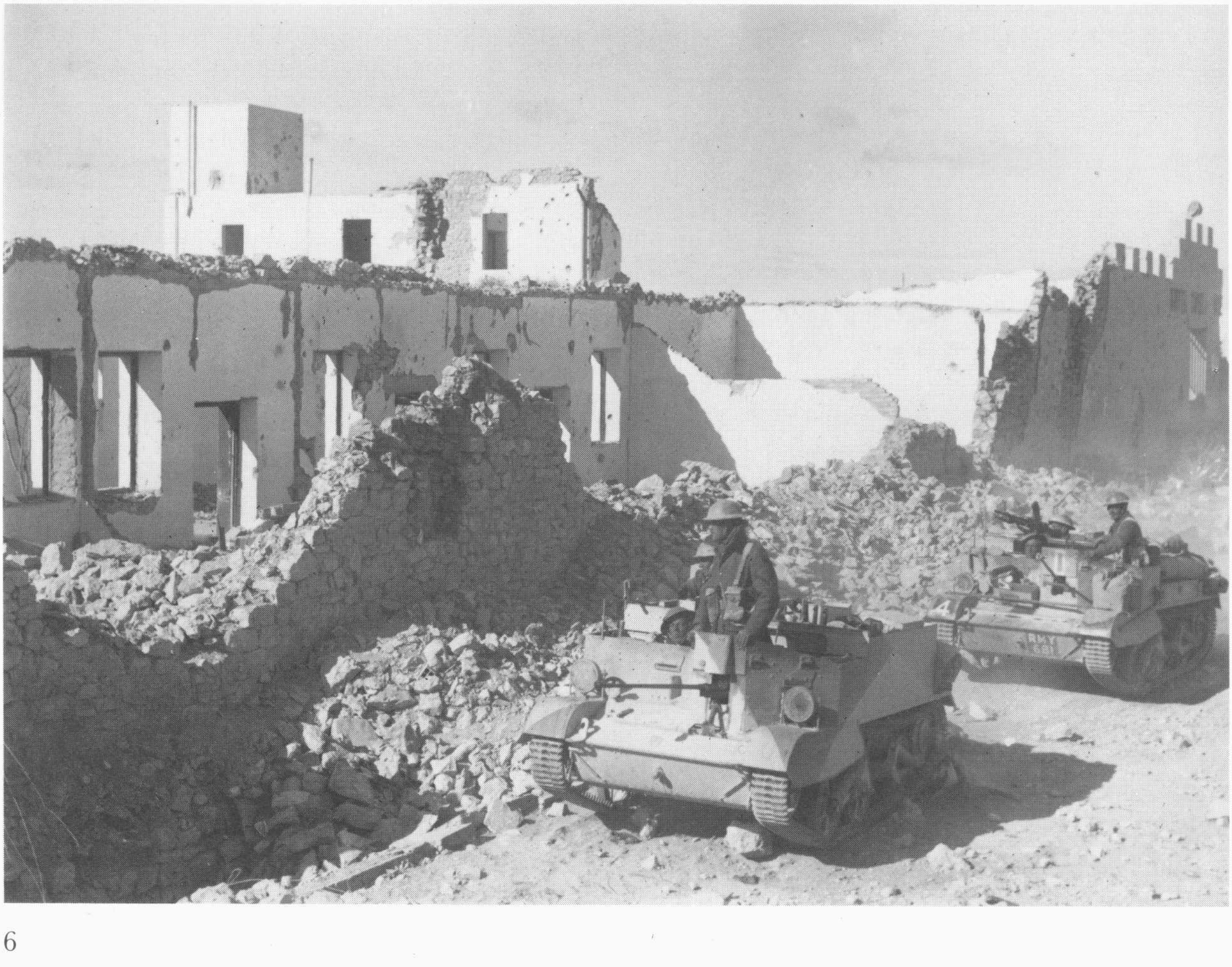
In a less conservative era of military thought the Second Boer War would have been regarded as a complete justification for the establishment of a strong mounted infantry corps. Notwithstanding, the concept was sharply criticised on the grounds that mounted infantry possessed neither the steadiness of marching infantry nor the dash of cavalry; such generalisations revealed rather more prejudice than could fairly be reconciled with the truth. Rather more telling was the comment that during dismounted action a mounted infantry unit immediately lost 10 per cent of its strength as horse-holders, and that since the latter were clearly vulnerable, further troops would have to be detached to guard them. Often quoted in this context was the strangely named 'Affair of Petrusvitch's Garden', which took place in 1880 during Russia's period of expansion into Central Asia. General Petrusvitch himself had been killed while leading a dismounted attack against a fortified Tekke position when, at the precise psychological moment, the enemy launched a flank attack against his horse-holders. Fortunately, reinforcements arrived in time to prevent a dangerous situation developing into a massacre. The problem exists to this day, for when planning a dismounted action every mechanised infantry commander must give careful thought to the positioning of his APCs.

What might have happened in 1914 had the German Army's wheel through Belgium been made with mounted infantry remains a matter for speculation. Throughout the First World War the major fronts offered scant opportunity for the employment of mounted troops of any kind. The one exception was Palestine. Here the armies were smaller; there were less machine guns per mile of front, fewer dense wire entanglements, and more room for manoeuvre. By September 1918 the Turks had been pushed back north of Jerusalem, the flanks of their main line resting on the sea and the Jordan valley. By means of an elaborate deception plan Gen. Sir Edmund Allenby, the British commander, convinced them that he was on the verge of launching a major offensive on the Jordan sector, when his real intention was to break through on the coast. Here he had posted the formidable Desert Mounted Corps under Maj.-Gen. Harry Chauvel, an Australian regular officer who possessed a highly developed instinct for mobile warfare. Chauvel's troops consisted of Australian and New Zealand Light Horse, regular Indian Cavalry and British Yeomanry; some regiments were armed with the lance and sword, but the primary weapon of all was now the rifle, supported by the fire of horse artillery batteries and mounted machine gun squadrons. In essence, therefore, the Desert Mounted Corps was a mounted infantry formation, which had already confounded critics of the breed by displaying a rock-like steadiness in defence and a frightening zeal for the attack.

Allenby's offensive opened at 0430hrs on 19 September with a whirlwind bombardment, leading to the prompt capture of the enemy's trenches by the British infantry. The Desert Mounted Corps streamed through the gap, swinging away to the east towards its strategic objective of the Upper Jordan fords, severing the Turkish communications and paying special attention to the elimination of corps and army headquarters. By the evening of 21 September three Turkish armies had ceased to exist, and Allenby had begun an advance which did not end until Turkey surrendered the following month. He named his victory after nearby Megiddo which, by coincidence, had also been the scene of a major chariot battle in ancient times.

Together, Allenby's planning and Chauvel's leadership had combined every element of what would later be recognised as the *blitzkrieg* technique—concentration of force, continuous movement, an indirect approach to the objective, deep penetration, strategic paralysis, and close co-operation with aircraft. Megiddo was, therefore, the crowning achievement of the mounted infantry arm; perversely, it was also its last, since the conditions prevailing in Palestine could not be expected to exist elsewhere. The tank had restored mobility to the battlefield at large, however, and it was now clear that a general acceleration in the pace of land operations was taking place. With the days of the horse visibly numbered, the principles of mounted infantry warfare had to be translated into a mechanised environment; in fact, some steps in this direction had already been taken.

Carrier patrol of the 1st Bn., King's Royal Rifle Corps visiting the ruins of Fort Capuzzo, summer 1940. The vehicles are armed with the Bren light machine gun and the Boys anti-tank rifle. (Imp. War. Mus.)

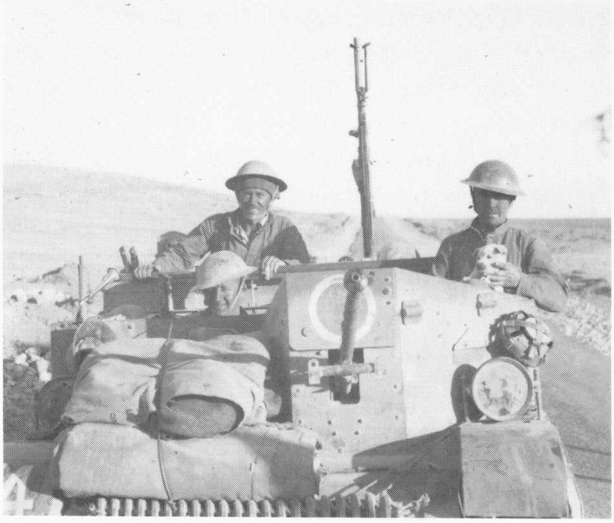


Early Mechanised Operations

The motor lorry had been used for troop transport since its invention, but it was some years before its full tactical and strategic potential were firmly grasped. The Jäger regiments of the German cavalry divisions leading the advance through Belgium in August 1914 were provided with a limited number of motor vehicles to help them keep up, but after the Western Front had congealed these were diverted to other uses (see Vanguard No 25, *German Armoured Cars and Reconnaissance Half-Tracks*). Of greater relevance were the celebrated 'taxis of the Marne', commandeered at short notice to transport the garrison of Paris to the front the following month, as this episode represents the first occasion on which infantry were deployed *en masse* by means of mechanical transport. During the American incursion into Mexico in 1916 in pursuit of the irregular forces of Pancho Villa Brig.-Gen. John Pershing supplemented his cavalry with lorry-borne infantry, demonstrating a clear awareness of the need for combined mobility and firepower in counter-insurgency operations.

The first hint of what could be achieved by mechanised infantry was given during the Rumanian campaign of 1916. The armies of the Central Powers, commanded by Gen. Erich von Falkenhayn, had managed to capture the Vulkan Pass on the northern sector of the front, but were unable to press their advantage because poor roads were seriously affecting the supply situation. The difficulty could be resolved if the main railway line which ran from the west could be secured; the problem was that the railway ran through the famous Danube gorge known as the Iron Gate, lying some 50 miles south-west of the Vulkan Pass. The position was naturally strong, and was stubbornly held by a Rumanian division which had thus far successfully resisted all attempts to dislodge them. Furthermore, close behind the Iron Gate lay the town of Turnu Severin, which was surrounded by a ring of small forts.

Time was of the essence, and Falkenhayn decided to lever the Rumanians out of their position by means of the indirect approach, using a small mechanised detachment to penetrate Turnu Severin from the east. The detachment was commanded by a Hauptmann Picht and consisted of the 1st Bn. 148th Infantry Regt.; three machine gun platoons with a total of 12 guns; two self-propelled anti-aircraft guns (otherwise known as BAKs or Ballon Abwehr Kanone); a radio section; and a mounted officer's patrol from the 10th Dragoons—altogether some 500 men were involved, all save the dragoons riding in heavy 2½-ton trucks.



Close-up of carrier armament and stowage details, Western Desert, 1940. The Bren is mounted on a swivelling pintle for use in both the ground and the A/A roles. (Imp. War Mus.)

Picht's little command travelled through Filiasu, Strechaia, and Prunisor, the signals section constantly tapping the enemy's telephone network with interesting results. One call confirmed that the Rumanians were aware of the column's presence, but seriously overestimated its strength; a second, that reinforcements were on their way back to Fort Simianu, guarding the defile which was now the last obstacle between the column and Turnu Severin. Picht decided to forestall their arrival and reached the fort shortly after dusk, the startled garrison surrendering without a fight when his men broke in from the rear. He then set an ambush in the defile which dispersed the Rumanian reinforcements.

The Germans clambered back aboard their vehicles and an hour later were in possession of Turnu Severin, inside the ring of forts and astride the communications of the enemy division holding the Iron Gate. Picht hastily established a defensive perimeter, siting his BAKs to fire west and north,

Dramatic aerial view of a mixed Panzergrenadier/assault artillery battlegroup in action on the Eastern Front, mounted in StuG III SP guns and SdKfz 250 half-tracks. (Bundesarchiv)

the most likely directions from which the Rumanians would try to eject him.

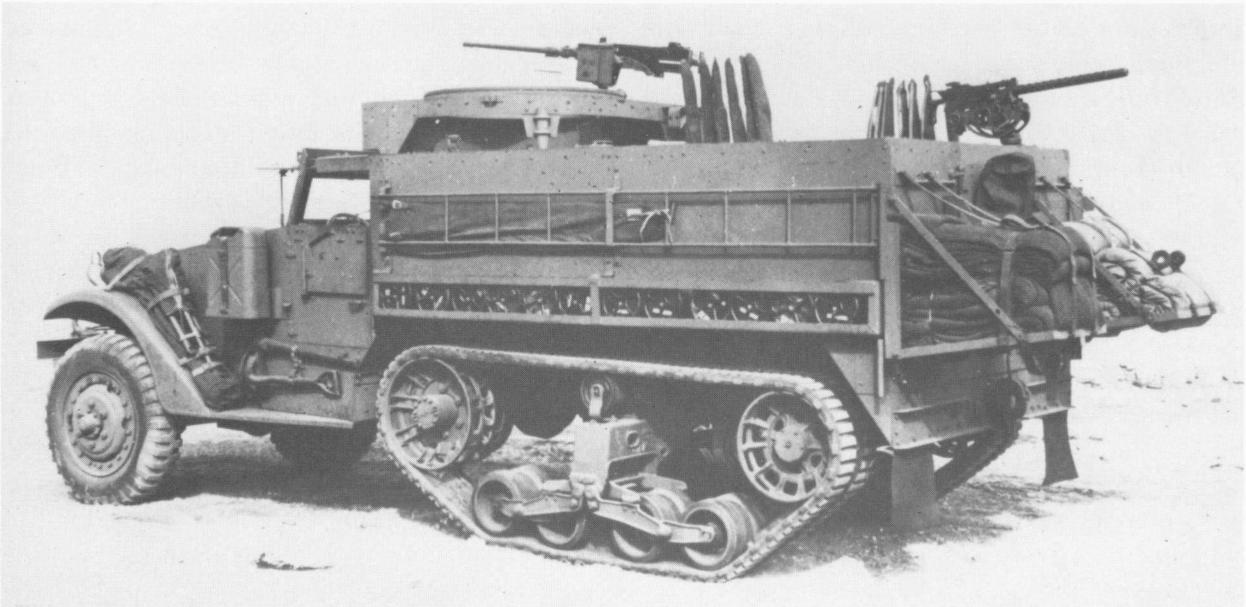
The counter-attacks began early next morning and gained in strength throughout the day. During the afternoon large numbers of the enemy could be seen streaming back from the Iron Gate, and it was clear that in the overall context the German coup was having the desired effect. Casualties had been heavy, however, and the signals section broadcast continuous appeals for reinforcement and for replenishment of the rapidly dwindling ammunition supply. Some help did arrive, in the form of a Bulgarian lieutenant who ferried his machine gun platoon across from the south bank of the Danube; but the German battalion was now facing odds of ten to one and fighting desperately for its life.

The night was comparatively quiet, but the following day brought a renewal of the Rumanian attacks in even greater strength than before. Much of the fighting took place at point-blank range. One of the BAKs was knocked out, as were several machine guns; even more serious, the remainder began to run short of water at a time when men simply could not be spared from the firing line to fetch more. With his ammunition all but exhausted, Picht could only hope that his Austrian allies were following up the enemy's withdrawal. They were, and early in the afternoon a cyclist brigade managed to break through, bringing with them two lorryloads of priceless ammunition. The Rumanians made one more abortive attack and then abandoned the area; the Iron Gate was open, and a victory for the Central Powers assured.

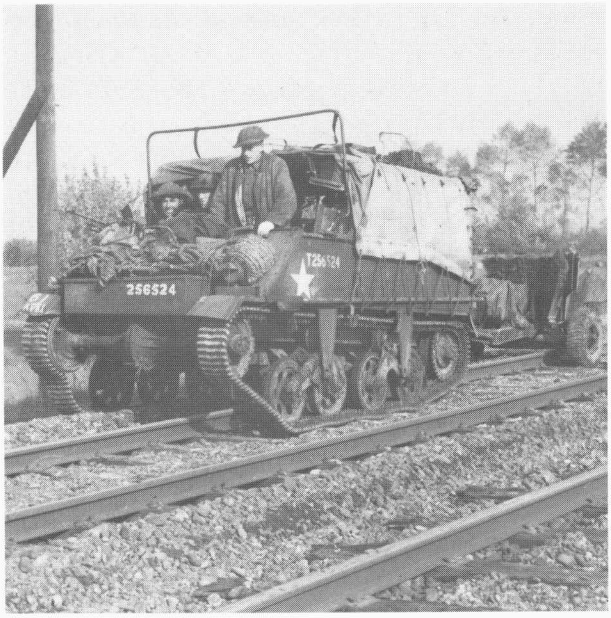
Picht's remarkable achievement can be regarded as the grandfather of all mechanised infantry operations. That its success did not stem from a series of fortunate coincidences was confirmed by two similar episodes which took place during the Russo-Polish War of 1920, both of which involved penetration well beyond the Soviet front and the seizure of an important communications centre by means of the indirect approach. The first saw the Russians pitched out of Zitomierz by a mobile column under the command of Col. Biernacki, consisting of two infantry battalions riding in some 40 lorries, a battery of 75mm guns towed by Austro-Daimler trucks, a troop of three Ford Model T armoured cars and a detachment of mounted chasseurs. What makes this operation particularly interesting is that while half the infantry travelled in lumbering Packards, which made heavy weather of the sandy Polish by-roads, the remainder rode in Fiat-Kegresse half-tracks, which coped splendidly with the most difficult going. Adolphe Kegresse was a French engineer who for many years had managed the Czar's garage in St Petersburg. As early as 1910 he had solved the problems of driving on snow by replacing the rear wheels of the Imperial cars with units comprising a continuous ribbed rubber track, four double road wheels suspended in pairs, a drive wheel and an idler wheel. This conversion performed as efficiently in mud and sand as on snow, and throughout the First World War the Russian Army had applied it to a wide variety of vehicles, including imported Austin armoured cars. So far as can be ascertained, the raid on Zitomierz was the first occasion on which half-tracks were employed in the mechanised infantry role in which they were to become paramount, and in which they are still used by many armies.

The second operation involved the capture of Kowel, an important railway junction which also housed the headquarters of the 12th Soviet Army, and was timed to coincide with a major Polish offensive. The column detailed for the task was commanded by Maj. Bochanek and consisted of 11 armoured cars (one Packard, two Whites and eight Fords), two motorised 75mm artillery batteries, and two infantry battalions riding in 43 trucks. Penetration of the Soviet lines was not difficult, for the front was not continuous; on the other hand, Bochanek knew that he would be observed and that his progress would be reported. His initial line of march, therefore, was planned so as to give the impression that the column had no interest in Kowel, some 50 miles distant, and that its probable objective lay in territory controlled by the neighbouring 4th Soviet Army. After dark, however, the column reached a crossroads and turned right onto a road leading directly into Kowel from the north.

From this point Bochanek's career became nothing if not colourful. Villages were stormed, guns captured and prisoners taken. Now thoroughly alarmed, the Bolsheviks set fire to a wooden bridge in his path; the column roared across the blazing structure, which collapsed shortly after the last vehicle had passed. A Russian battery, deployed across the road, opened fire and missed; it did not get a second chance. Just short of Kowel the Bolsheviks, now desperate, threw in their last reserve. Three armoured trains opened fire on the column from converging branch lines. Bochanek did not intend to be baulked at this stage; he sent his advance guard on into the town with orders to capture the railway station. Consisting of four armoured cars, two infantry companies and half a motorised battery, this force carried out its mission in fine style, doing considerable execution in the crowded streets before the Russians, estimated to number two divisions, broke and fled. With the fugitives went the entire staff of 12th Soviet Army, leaving behind all their maps and papers.



M3A2 half-track APC fully stowed and ready for action, mounting a .5in and a .3in machine gun. The sharpened stakes are for stringing barbed wire during consolidation of the objective, one of the usual tasks of mechanised infantry; the rack along the outside of the hull contains unprimed mines which could also be incorporated into the consolidation scheme. (RAC Tank Museum)



Loyd Towing Carrier of an anti-tank platoon, towing a 6pdr A/T gun near 'sHertogenbosch, autumn 1944. The 'foul weather' canopy was seldom erected, as it was more trouble than it was worth; in this photo it is rolled back beyond the crew compartment, for the sake of visibility. Note barbed wire for use in consolidation; and the characteristic 'slap' of the track which accompanied a steering adjustment. (Imp. War Mus.)

Meanwhile, the main body of the column had fought a spirited duel with the armoured trains, ending in the latter's complete defeat. Unable to match the output of the famous '75s', now firing over open sights, and with their ports smothered by an incessant hail of machine gun and small arms fire, the Russian crews had soon had enough. One train, badly damaged, clanked off through Kowel while the battle for the railway station was still in progress; the others retreated westwards to temporary safety, but were later found abandoned and taken into Polish service.

Advised that the station had been secured, Bochanek completed the occupation of the town, beating off a half-hearted counter-attack later in the day. The booty taken included scores of guns and automatic weapons, hundreds of railway trucks loaded with war material, and twelve aircraft. The greatest prize of all, however, was the strategic paralysis inflicted on the enemy by the elimination of 12th Soviet Army's headquarters: the Russian front disintegrated under the impact of the main Polish offensive, the leading elements of which broke through to Bochanek the day after his seizure of Kowel.

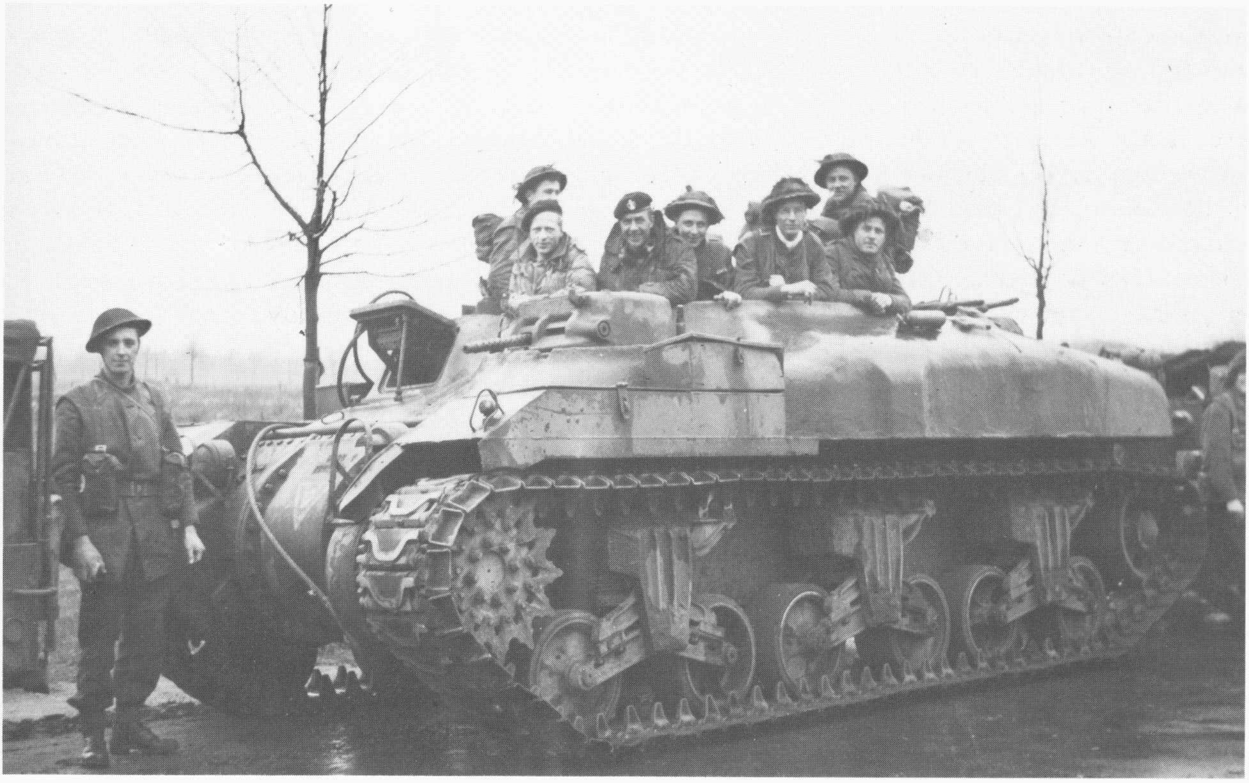
Although executed with primitive equipment, the operations so successfully concluded by Picht, Biernacki and Bochanek had established the basic principles of mechanised infantry warfare. On the Western Front some thought had also been given to the protection of infantry accompanying tank attacks. During the Battle of Amiens (8 August 1918) the Mark V Star tanks of 1st Bn., The Tank Corps each carried two infantry machine gun teams, the intention being that these should be dropped on the objective itself. In the event the experiment was counter-productive. The combination of intense heat, fumes and uneven motion inside the tanks induced such asphyxiation and nausea that the infantrymen arrived quite unfit for duty; indeed, the experience gave rise to a prejudice against the whole concept of armoured infantry, which was to last for many years to come. In fact many of the problems had already been solved during the development period of the Tank Mark IX, which can be regarded as the first purpose-built armoured personnel carrier.

Known as The Pig because of its shape, the Mark IX could accommodate 50 infantrymen who entered and left the vehicle by way of two oval doors in each side of the hull. Armament consisted of two Hotchkiss machine guns, but a row of loopholes enabled the infantry to engage targets while still mounted. The interior was reasonably uncluttered and somewhat more comfortable than that of earlier tanks, the engine and radiator having been moved well forward. Only 35 of these vehicles had been built when the war ended, and none were used operationally. Subsequently, there was no immediate use for the Mark IX, for although its top speed of 4mph was adequate enough for slow-moving set-piece attacks against trench lines, it was now clear that the mechanised operations of the future would be conducted at a vastly accelerated pace. Nonetheless, the vehicle did incorporate a number of far-sighted features; and an amphibious version known as the Mark IX Duck was actually being tested on the day the Armistice came into effect.

The Inter-War Years

From the technical viewpoint the most important event in the years following the First World War was the partnership established between the French Citroen company and Adolphe Kegresse after the latter's return from Russia. In 1923 five Citroen-Kegresse half-tracks successfully completed the first motorised crossing of the Sahara, the system being subsequently adopted by the French Army for a series of armoured cars and, more significantly, as a weapons carrier for the *dragons portées* who formed the rifle element of the newly mechanised cavalry divisions. The military future of the half-track was now assured; fitted with bullet and splinter-proof armour, it was, in its various forms, to dominate mechanised infantry operations throughout the Second World War and beyond, since it was the only type of vehicle which could keep pace with tanks when moving across country. It is curious that in spite of its obvious potential it was adopted for general service only by the United States and German armies, and then only after a leisurely development history involving, in both cases, experimental artillery prime-movers. (See Vanguards No 25, *German Armoured Cars and Reconnaissance Half-Tracks*, No 31, *US Half-Tracks of World War II* and No 32, *The SdKfz 251 Half-Track.*) The majority of armies relied solely on the unarmoured lorry to transport such mechanised infantry formations as they possessed, although the British Army also produced a series of lightly armoured, fully tracked weapons carriers which had a widespread application and which are remembered generally—though not altogether accurately—as Bren Carriers.

The theory of mechanised infantry warfare evolved a little more quickly, which is not really surprising given that the three best-remembered tank pioneers—Fuller, Liddell Hart and Guderian—were all infantrymen with a strong bent towards light infantry tactics. Had Fuller had his way, in fact, the great tank victory of Amiens would have been exploited by Whippets and lorried



Ram Kangaroo with infantry section aboard, seen near Ochtrup, early 1945. The insignia of 79th Armd. Div. is visible on the bow plate. This vehicle probably belongs to 49 RTR, although the commander is wearing the general issue 'mailed fist' Royal Armoured Corps cap badge in his black beret. He and the driver wear the angora-lined waterproof tank suit. (Imp. War Mus.)

Using a combination of Kangaroos and carriers, an infantry battalion and its heavy weapons could be transported very quickly into the forward edge of the battle—in this case the 2nd Bn., Seaforth Highlanders in NW Europe, winter 1944–45. (Imp. War Mus.)

infantry instead of Whippets and cavalry, but that was not to be; even the briefest examination of the battle and its immediate aftermath will confirm that Fuller was undoubtedly right. By the end of the First World War it was clear to him that while tanks and infantry both have their limitations, together each possesses the ability to solve many of the other's problems. For example, while tanks can take ground it requires infantry to hold it securely; and while tanks are capable of eliminating machine guns which are holding up the infantry's advance, an infantry attack is often the best method of dealing with concealed anti-tank guns. It was, therefore, entirely logical that tanks and mechanised infantry, together with supporting artillery and field engineers, be grouped together in offensive mobile formations. These conclusions were first given substance in the Experimental Brigade exercises on Salisbury Plain in 1921/22, and developed to their full potential by the Experimental Mechanised Force exercises of 1927/28. To the annoyance of the Directing Staff, the Experimental Mechanised Force trounced its conventional 'enemy' long before the exercises were due to end, thereby generating intense interest throughout the international military community.

These and other exercises held during the next decade in Great Britain, Germany and the United States laid the foundations of the mechanised infantry tactics which were to be practised throughout the Second World War, and which remain valid to this day. It was, for example, immediately apparent that tanks and infantry must share the same overall commander if the maximum benefit was to be drawn from the relationship; that the infantry must follow in the wake of the tanks as closely as possible and must, therefore, be given a comparable mobility and, ideally, a degree of protection. It was also evident that in certain situations the advance should be led by dismounted infantry, covered by the fire of the tanks and artillery. These situations included, among others, the establishment of a river crossing; movement through built-up areas, woodland and standing crops in which the tanks were at risk from concealed weapons; and, as already mentioned, the elimination of anti-tank gun screens. On open going, of course, the tanks led the assault onto the objective, followed closely by the infantry, who had dismounted and deployed on a previously selected line. By and large, the assault tactics preferred by mechanised infantry commanders reflected those of the old mounted infantry—the use of mobility to isolate the objective, followed by an attack on the flank or rear of the position.

The question of whether attacks should be made mounted or dismounted hinged—and still does—on the prevailing circumstances; and here it is necessary to re-state the function of the infantryman, whose primary purpose as defined by the School of Infantry at Warminster *is to close with and kill his enemy*. The force of this argument is indisputable, as evidenced by the recent Falklands War, in which the bayonet proved its relevance on more than one occasion. If the infantryman rides into the assault, therefore, he cannot perform his function, and much of his fire, delivered from a moving vehicle, will inevitably be wasted while the vehicle itself remains at high risk: thus, a mounted attack against a resolutely defended position is not appropriate. On the other hand, if the defence shows unmistakable signs of collapsing, giving up or bolting, a mounted attack can be pressed home, provided armoured carriers are used. The use of unarmoured carriers in such circumstances was never contemplated.

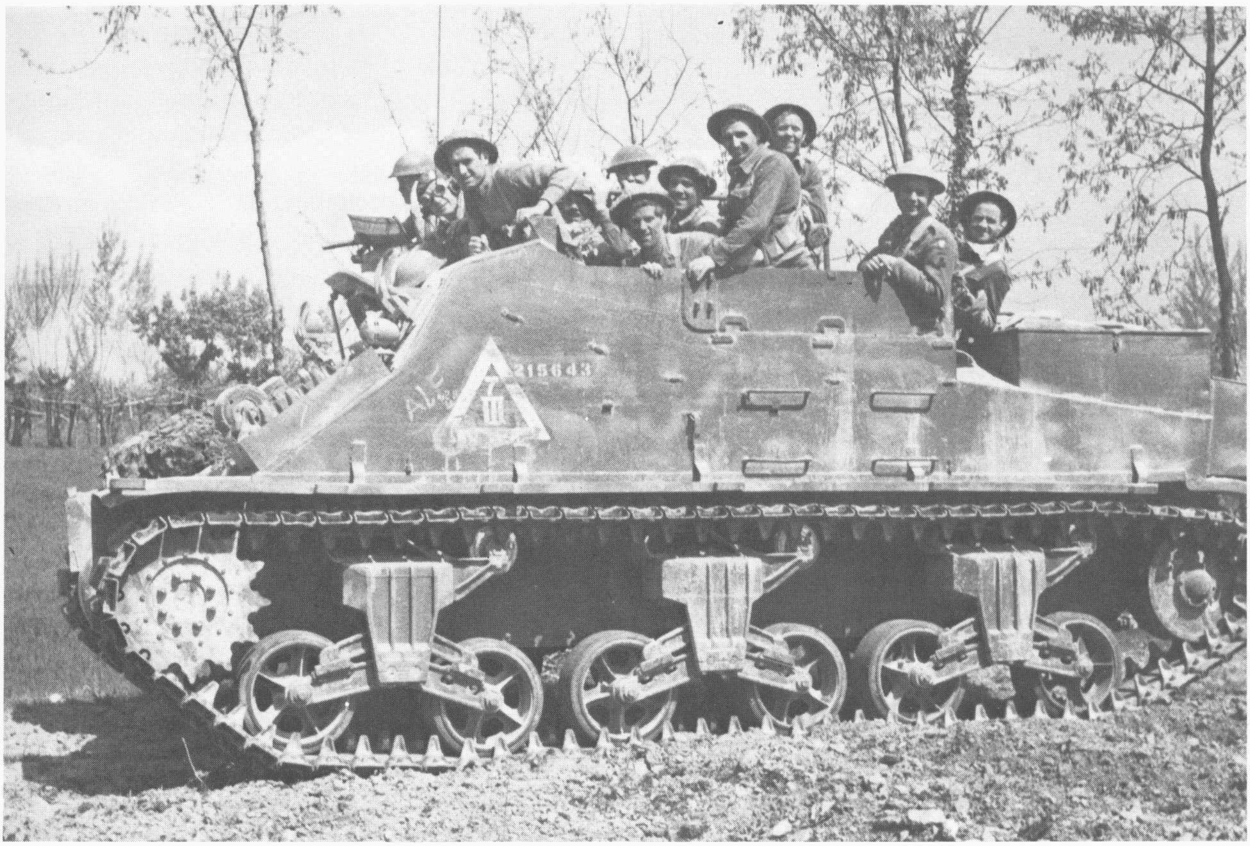
Further mechanised infantry roles which were evaluated during this period were the consolidation of the shoulders of a salient which had been driven into the enemy line by an armoured attack; flank protection of divisional axes of advance; and night security of tank leaguers. The need for flexible command and control, exercised through a radio net, was also appreciated in the early experimental years.

The lessons arising from the only major conflict of the period, the Spanish Civil War, were entirely negative from the tank enthusiast's point of view, yet clearly underscored the decisive value of mechanised infantry. The armour of both sides had its successes, breaking away deep into the enemy's rear, only to retire hastily whence it had come because it lacked the infantry with which to consolidate its gains.

Elsewhere, the state of the art developed in various ways. On the outbreak of war the British Army, which had nurtured to germination the seeds sown during the First World War, remained crippled by years of political neglect and possessed only a handful of mechanised infantry battalions, albeit of good quality, which were serving with its two embryonic armoured divisions, one of which was based in Egypt. The French military establishment was not greatly interested in the idea, and since it believed that the sole function of the tank was the support of marching infantry, it had not formed a single armoured division. The United States Army was small and, like the British, starved of funds, but was fully conversant with the applications of mechanised infantry, and was well advanced in the development of the M2 and M3 half-track series.

In contrast, the mighty Red Army found itself running in ponderous circles. Led by the strange but brilliant Marshal Mikhail Tukhachevsky, one faction of officers within its ranks favoured the theories of Fuller and Liddell Hart and wished to proceed with wholesale mechanisation. Several mechanised corps and brigades were established, each with their own organic infantry element. These may have relied solely on lorries, of which

Another variation on the Kangaroo theme was the 'Unfrocked Priest', which was simply a Howitzer Motor Carriage M7 ('Priest' to the British) with main armament removed. This example was photographed near Conselice in Italy shortly before the end of the Second World War. (Imp. War Mus.)



19 February 1945: the assault wave of the US 4th Marine Div. heads for the beaches of Iwo Jima across a crowded sea. The LVT proved invaluable in the later Pacific island landings: only a vehicle of this type could take the infantry and their supporting equipment across the reefs which guarded many beaches, enabling them to reach dry land close behind the naval bombardment. (USMC)

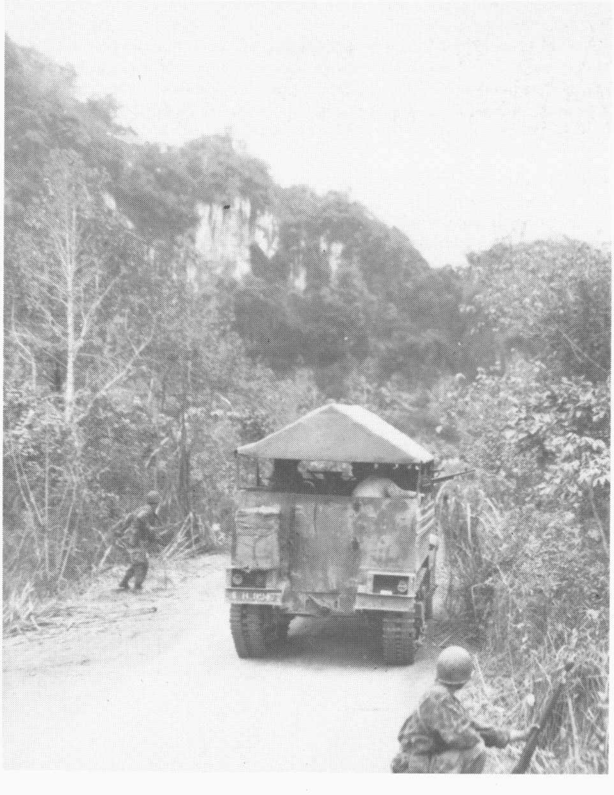
there was a perennial shortage, to transport their infantry, and may have been almost totally deficient in radio equipment, but they did provide a structure in which the Soviet soldier, woefully backward in his technical education, could have been schooled in modern combat techniques. Given time, some degree of expertise must inevitably have followed. That, however, was not to be, for within the Communist theology the Army remains the tool of the Party and not the servant of the State. Stalin, frightened by the growth of independent thought within the Army—the only body capable of removing him and his henchmen from power—had Tukhachevsky and thousands of like-minded officers slaughtered in the orgy of mass murder known as The Great Purge. The mechanised formations were broken up, largely on the advice of Lt.-Gen. Pavlov, whose experience as commander of the Soviet tank contingent in Spain had led him to question not only the potential of the tank but also the possibility of controlling large integrated formations in action; the successful defence of the Soviet Union, ran the contemporary cant, could be achieved solely through the massed rifles of the proletariat. The direct consequence of this blend of paranoia and muddled thought was that the Red Army fought its way through the Second World War, from start to finish, without armoured personnel carriers, and paid a horrible price for doing so.

In Germany the mechanised infantry concept had all but achieved the status of being a separate arm of service. In one way this is not surprising, for under the terms of the Versailles treaty she had been denied tanks and her Army had been restricted to 100,000 men who would have to rely on internal mobility to defend the country's long frontiers. Yet in spite of the thought given to this problem, the Army was innately conservative in its structure and the older members of its hierarchy were stubbornly opposed to any change the full implications of which they did not understand. While working in the Defence Ministry's Motorised Troops Department the then Capt. Heinz Guderian once suggested to his Inspector, Col. von Natzmer, that the Reichswehr's lorries possessed a combat potential; outraged, Natzmer bellowed that they were meant to carry flour, and there the discussion ended. Nonetheless, Guderian persisted and it was thanks to him and to his close association with Gen. Lutz, head of the newly formed Armoured Troops Command during the early 1930s, that the mechanised infantry branch expanded as quickly as it did during the period of German rearmament. This expansion paralleled that of the Panzerwaffe, producing not only the motorised Rifle regiments and motor-cycle battalions which formed part of the Panzer divisions' establishment, but also Motorised infantry divisions which could be grouped together in Motorised corps. The first Motorised divisions—the 2nd, 13th, 20th and 29th—were formed in 1937, and service in them and in the Rifle regiments of the Panzer divisions was deemed to be a signal honour.

In British service in Italy the LVT was known as the 'Fantail'. Here, men of 2nd/6th Bn. The Queen's Regt. wade ashore at Lake Comacchio; the turning of the German flank and the breakthrough at the Argenta Gap in April 1945 by 56th Inf. Div. and No 9 Cdo., transported in LVTs, was one of the most convincing examples of the use of the amphibious APC during the European war. (Imp. War Mus.)

The Second World War

Despite its development of fast, hard-hitting tactics, its flexibility exercised through command radio links and its thorough training, the mechanised infantry branch of the German Army went to war with one serious deficiency, and that was equipment; nor, thanks to Hitler's insistence on the continued expansion of the Panzerwaffe while simultaneously increasing the number of Motorised infantry divisions, was the hard-pressed German armaments industry ever able to remedy this defect by keeping pace with what became an impossible demand. In September 1939, for example, there were only sufficient SdKfz 251 APCs to equip 0.5 per cent of the existing mechanised infantry companies. In May 1940, on the eve of the invasion of the West, the Army possessed 80 battalions of motorised infantry, but only two of these were equipped with APCs. In September 1943, which can be regarded as the high point of the German mechanised infantry equipment programme, only 26 out of 226 battalions were classified as being armoured. The remainder had to make do with unarmoured versions of the 251 chassis or with lorries. The shortage of APCs was further aggravated by their use as weapons platforms, command vehicles, engineer vehicles, armoured ambulances, and so on. There were no less than 20 variants on the basic SdKfz 251 and a dozen or so on the smaller SdKfz

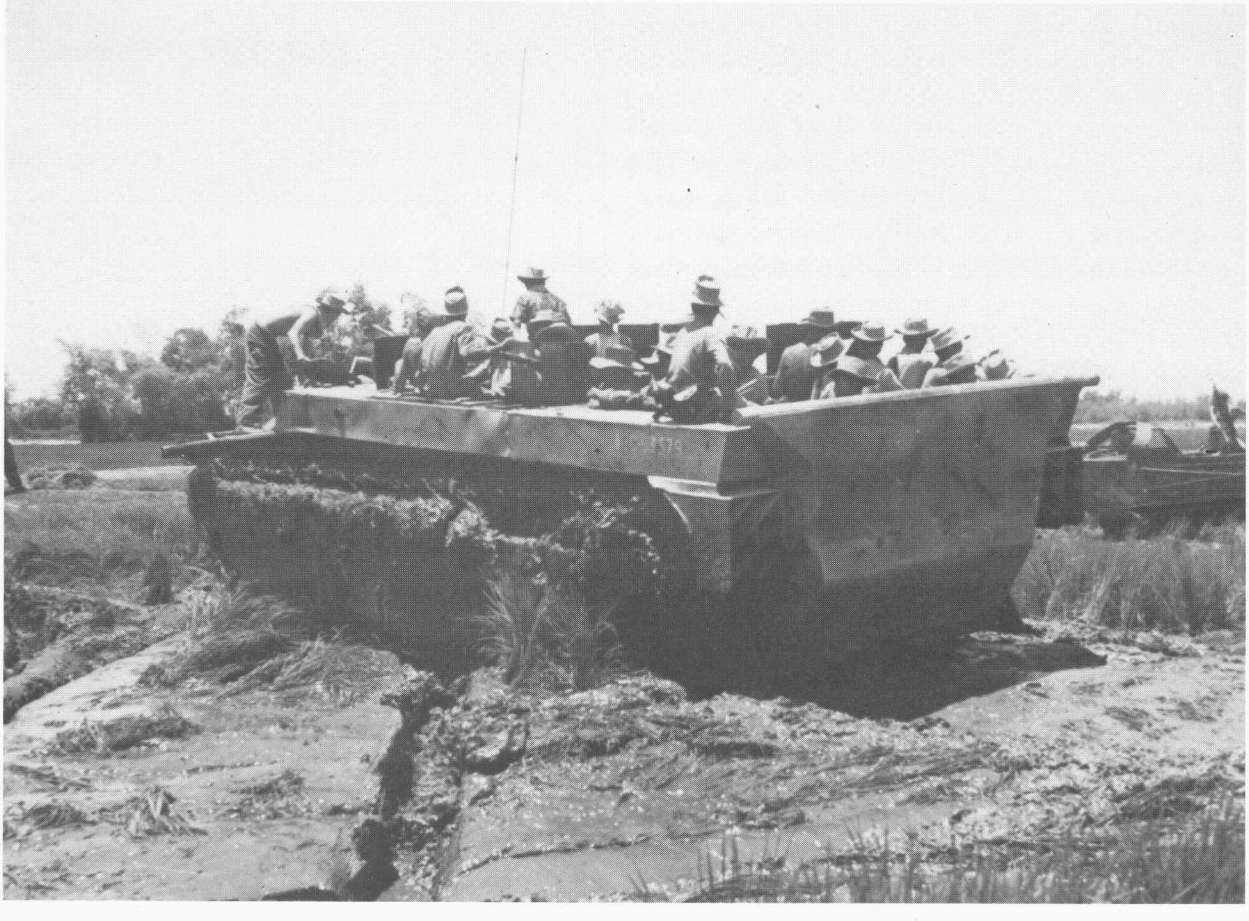


Road security against ambush by irregular forces was a constant feature of the colonial campaigns which followed the Second World War, and the M3 series half-tracks supplied to her allies by the USA saw a great deal of action in this role, for which they were neither designed nor particularly suitable. They had the advantage of availability, and could protect their crews and engines against small arms fire; but they were vulnerable to the mining which characterises this kind of warfare, and the open tops were a choice target for hand grenades lobbed from thick cover. Here French paratroopers deploy along the edge of a narrow road through thick jungle in Tonkin in 1952, backed by the automatic weapons of the crew of a half-track fitted with a sloped canvas anti-grenade canopy. (ECPA, courtesy Simon Dunstan)

250 armoured half-track; some of these were undoubtedly useful, but others were a luxury and did not pay for their keep. Yet such was the value of APCs that a memorandum prepared by OKH during the last year of the war commented that: 'It is even said by some that commanders would prefer to lose tanks than their infantry carriers.'

The story of German mechanised infantry during the early war years is contiguous to that of the Panzerwaffe, which has already been recounted in a number of works forming part of this series. Two points of interest, however, arose from the advance across France to the Channel, the first relating to the use of mechanised infantry in the strategic role. Just as the motorised Rifle regiments followed closely behind the armoured spearhead of the Panzer divisions, so Guderian's all-important XIX Panzer Corps was followed by Gen. von Wietersheim's XIV Motorised Corps, the function of which was to protect against counter-attack the flank of the long corridor which the tanks were carving through enemy territory. The second illustrates what can happen when the principles of close co-operation are neglected. On 21 May, to the south of Arras, the two Rifle regiments of Maj.-Gen. Erwin Rommel's 7. Panzer-Division lost contact with their tanks and at this critical moment were struck in the flank by the British 1st Army Tank Brigade. Their 37mm anti-tank guns made no impression on the stout armour of the Matildas and both regiments sustained serious casualties, as well as losing much valuable equipment. The situ-

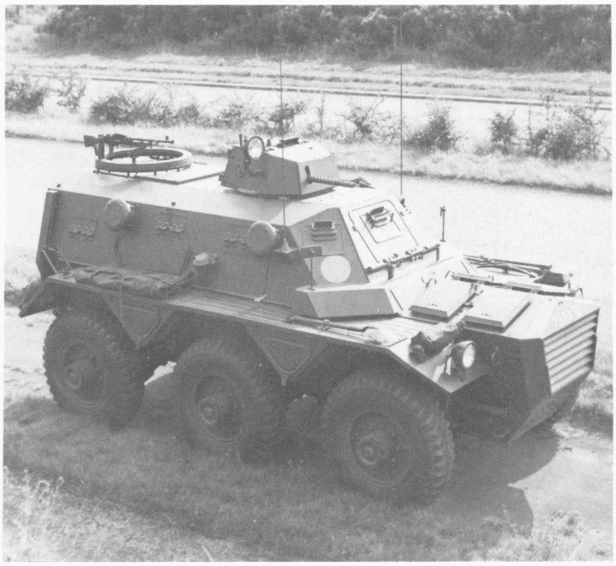
'Alligator'—LVT-4—of the French *1er Groupement Autonome* **carrying about two sections of locally-recruited infantry in the paddyfields of Annam, 1952. The amphibious combat units developed by the French forces between 1947 and 1953 proved effective in pursuing the Vietminh into semi-flooded areas which had previously offered a sanctuary from both land vehicles and boats. The classic unit structure, from April 1953, was the** *Groupement Amphibie* **of three** *Groupes d'Escadrons Amphibies***; each** *Groupe* **comprised a squadron of 'Crabs' (as the French termed the M29 Weasel amphibious cargo carrier), and a squadron of 'Alligators' carrying a company of infantry to back up the machine guns and recoilless rifles mounted on the 'Crabs'. See also commentary to Plate C. (ECPA)**



ation was restored by a combination of luck and desperate measures, including the urgent recall of the division's Panzer regiment; but the alarm engendered by the event contributed to the successful evacuation of the BEF from Dunkirk, along with a large number of French troops. This sort of situation tended to be the exception rather than the rule, although it was to be repeated on more than one occasion—the Matildas of 44 RTR virtually destroyed a Rifle regiment in similar circumstances during the opening phases of the Knightsbridge battle. Nonetheless, throughout the 1940 campaign in the West, in North Africa, the Balkans and in Russia, the élan and expertise of German mechanised infantry units, coupled with the flexibility which enabled them to be formed into *ad hoc* armour/infantry battlegroups, had earned them a tremendous reputation. In recognition of this the prestigious title of Panzergrenadier was conferred on the mechanised infantry of the Panzer divisions on 5 July 1942, and was extended to the Motorised divisions in March 1943; perversely, many regiments chose to retain their more ancient titles of Grenadier or Fusilier.

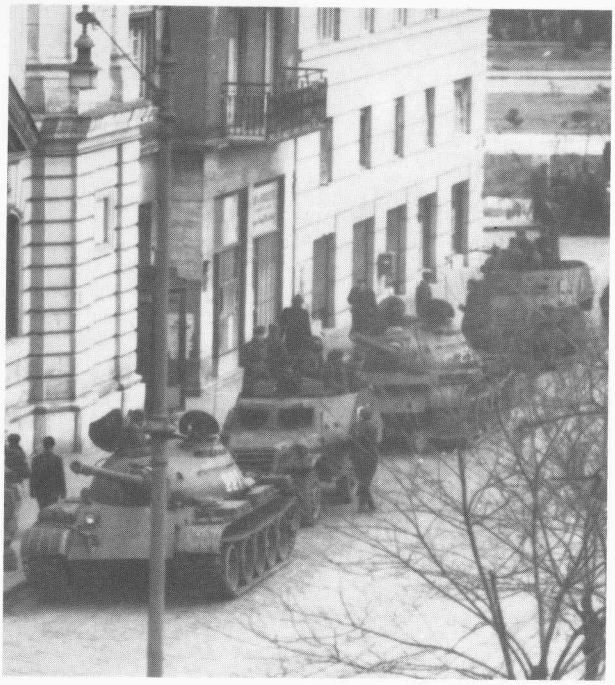
Meanwhile, a number of evolutionary developments had taken place which affected the structure of the Panzertruppen as a whole. First, the ratio of tanks to infantry within the Panzer division had fallen, largely as a result of Hitler's decision to double the number of Panzer divisions by halving the tank element of each. Controversial though this decision was, it nonetheless produced a formation whose composite arms were balanced in proportion to their abilities. Secondly, the motor-cycle battalions had suffered serious—and predictable—casualties, and their survivors were posted to the armoured reconnaissance battalions (see Vanguard No 25, *German Armoured Cars and Recconnaissance Half-Tracks*). Thirdly, just as it had long been appreciated that mechanised infantry were complementary to tanks, now it was realised that the reverse was also true and, beginning in 1942, each Motorised/Panzergrenadier division was provided with its own organic tank battalion; in practice, the general shortage of tanks meant that many of these battalions were equipped with assault guns manned by the specialist and extremely efficient Sturmartillerie.

From the latter half of 1942 onwards the Third Reich was fighting for its life, and in this context the role of the Panzergrenadier became critical. Whenever possible an offensive defence based on mobility was employed, the attackers being held against the anvil of the Panzergrenadiers' defended zone and then hammered by an armoured counter-attack against their flanks and rear. Panzergrenadier formations proved invaluable during the *Kesselschlachten* ('cauldron battles') of 1943 and 1944, in which large pockets of German troops fought their way throught the mass of the enemy towards their own lines. All too often, however, their units simply bled themselves white to no purpose in strict obedience to Hitler's incessant 'no withdrawal' orders.



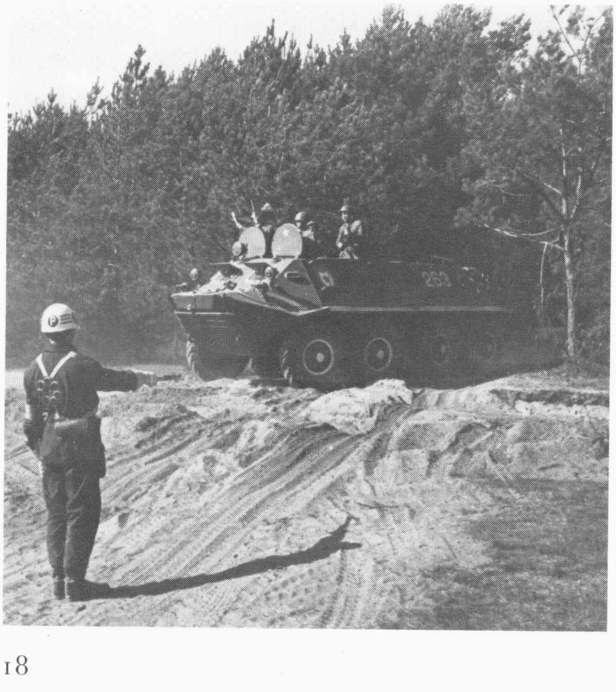
An early example of the Saracen APC, armed with a Bren LMG and a 7.62mm Browning MG. Counter-insurgency operations in Malaya and elsewhere accelerated the development of the wheeled APC within the British Army. Modified by the addition of a grill to prematurely detonate RPG-7 rounds, the Saracen still finds active employment in Ulster.

The use of mobility to counter vastly superior numbers was also employed by the British Army during the opening months of the war in North Africa. In addition to the harassing operations executed by the 7th Armoured Division's two armoured brigades, a number of small mobile columns were formed consisting of an armoured car squadron, a scout platoon in tracked infantry carriers, two lorried infantry companies, a battery of field guns and an anti-tank platoon. Named 'Jock Columns' after their originator, Brig. Jock Campbell, the commander of 7th Armoured Division's Support Group, these roamed far and wide,



After neglecting the APC throughout the Second World War, the Red Army soon became its most dedicated advocate. This photo, taken in Budapest during the 1956 Hungarian uprising, shows T-54 tanks and BTR-152 wheeled APCs; the one-to-one ratio is interesting, and was clearly adopted in response to serious tank losses incurred in street fighting with Hungarian patriots. (AP)

Military police control the movements of a Soviet Motor Rifle unit during the 1967 Exercise 'Dniepr'. The BTR-60 displays the banner, wreath and star insignia of a Guards unit on the hull side, plus a star on one of the hatches. (Novosti)



achieving a success which was quite disproportionate to the number of troops involved. At first the role of the lorried infantry companies was envisaged as being escort for the guns; that did not suit their temperament at all and in the event they were used aggressively, beating up isolated Italian garrisons, capturing forts, and generally making life miserable for Marshal Graziani's foot-sore infantry divisions. The Jock Columns served their purpose well at the time, but their continued use after Rommel had arrived in Libya was a mistake: not only was it inadvisable to take quite the same liberties with the Afrika Korps as one had with the Italians, but the dispersion of divisional artillery in this way was a departure from orthodox principles which had unfortunate consequences. That they survived as long as they did stemmed from very understandable desires to be off the leash, while simultaneously preserving the *beau sabreur* aspect of the Desert War as long as possible.

The British did not form motorised divisions in the German manner, but as the entire war in the desert was of necessity motorised, there were inevitable similarities in operational methods. One problem which beset motorised infantry commanders of both sides was what to do with their vehicles once a position had been occupied. If they were held nearby, they immediately attracted unwelcome attention to the position as a whole; if, on the other hand, they were sent too far to the rear, battalions would be unable to react quickly enough to take advantage of changed circumstances. No real answer was ever found, since none existed.

The British armoured division, like the German, began the war with more tanks than could adequately be supported by its organic motorised infantry element. This state of affairs became most glaringly apparent during Operation 'Crusader' (November/December 1941) when the 7th Armd. Div. deployed no less than nine armoured regiments but only three infantry battalions. The imbalance was corrected by the 1942 re-organisation in which the number of armoured brigades was reduced to one, consisting of three armoured regiments and a motorised infantry battalion, supported by a three-battalion motorised infantry brigade. Nonetheless, some divisions remained armour-heavy as late as the Second Battle of Alamein (see Vanguard No 23, *British Tanks in North Africa*).

Advance to contact: T-55 tanks and BTR-152s on exercise. Much Soviet training is based on sheer repetition, and the photo suggests that this particular drill had already been practised several times. (Novosti)

The Bren or Universal Carrier remained in service throughout the war, but when the fighting reached the mainland of Europe the motorised infantry battalions' 15cwt lorries were progressively replaced by the American M3 half-track. Infantry divisions were lifted as far as the rear area of the battle zone by Royal Army Service Corps TCVs (Troop-Carrying Vehicles), which were large trucks fitted with seats, each being capable of transporting a platoon. By 1943, however, it was appreciated by both the British and Canadian armies that circumstances would arise in which the delivery of non-motorised infantry to the forward edge of the battle could produce immense benefit. This realisation led directly to the development of the Kangaroo, a turretless Sherman or Ram tank in which an infantry section rode in what had been the fighting compartment. In North-West Europe the 79th Armd. Div. possessed two APC regiments so equipped, 49 RTR and the 1st Canadian APC Regt., and these were employed as operational necessity demanded. Some use, too, was made of 'Unfrocked Priests', which were simply Howitzer Motor Carriages M7 with the main armament removed, each capable of carrying two infantry sections. The majority of Unfrocked Priests served in a specially raised APC regiment on the 8th Army sector of the Italian front, but there is also mention of their use during the Normandy fighting.

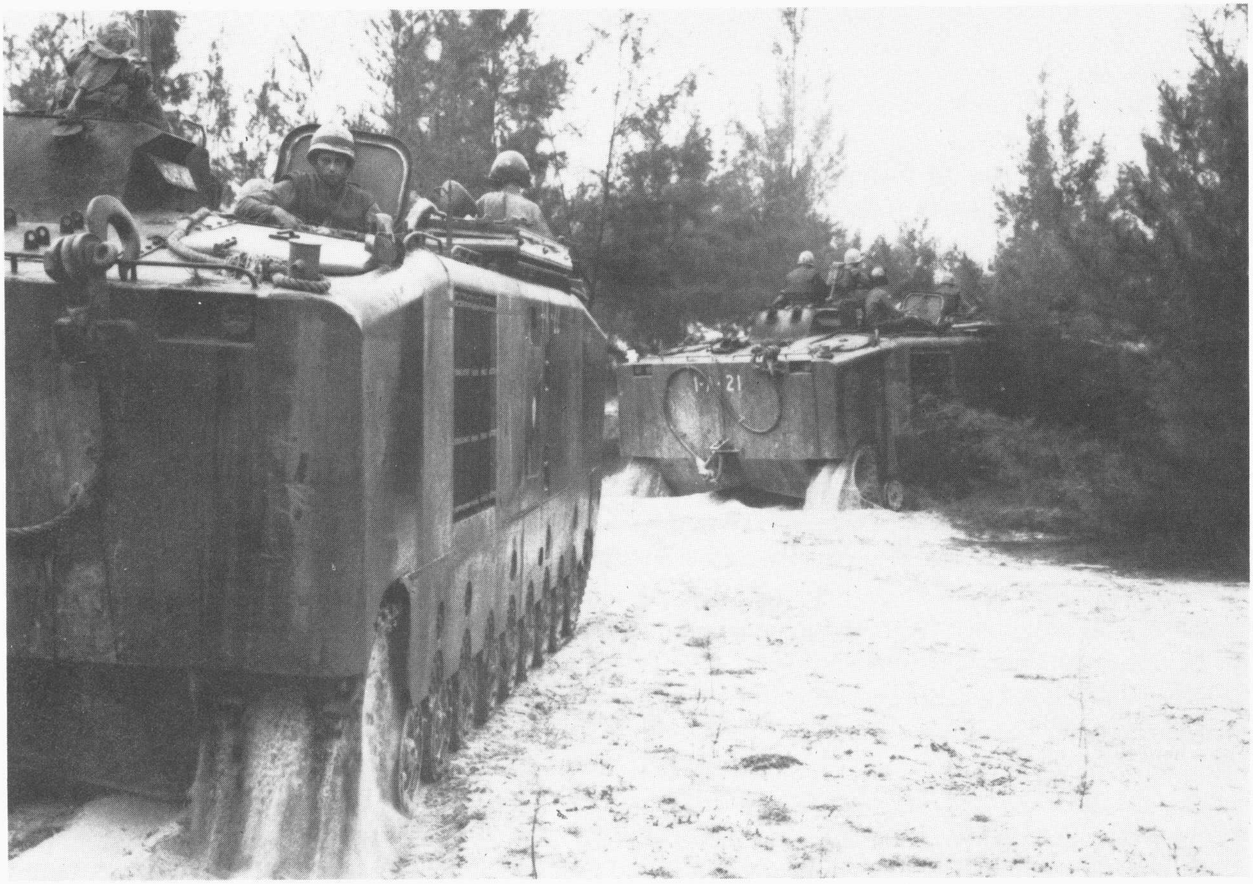
American armoured divisions also entered the war in a state of imbalance, the 1st Armd. Div. going into action in North Africa with six tank battalions but only three of armoured infantry; as the war progressed the divisional tank strength was halved but that of the armoured infantry remained constant. Within the division, of course, the flexible Combat Command system enabled a task force commander to request—if not always to receive—the proportion of armoured infantry to tanks he felt would be required to complete his mission.

As regards equipment, the American genius for organisation and mass production ensured that armoured infantry battalions were fully equipped not only with M2 and M3 half-track APCs, but also with a wide variety of self-propelled fire-support, anti-tank and anti-aircraft weapons, many of which are described in Vanguard No 31, *US Half-Tracks of World War II.*

The role of the armoured infantry battalions was entirely supportive, and they were never intended to become a separate branch of service in the German manner. It is, however, interesting to note that during Operation 'Cobra', the US Army's breakout from the Normandy beach-head, the entire 1st Inf. Div. was mechanised for just the same purpose as had been Wietersheim's XIVth Motorised Corps during the Battle of France in 1940. Again, during the German Ardennes offensive of 1944 it was the mobility and defensive capability of the American armoured infantry battalions, coupled with the hastily organised but efficient road march of the 82nd and 101st Airborne Divs. into the area, that restored a sense of stability and finally baulked the Führer's plans for a victorious drive on Antwerp.

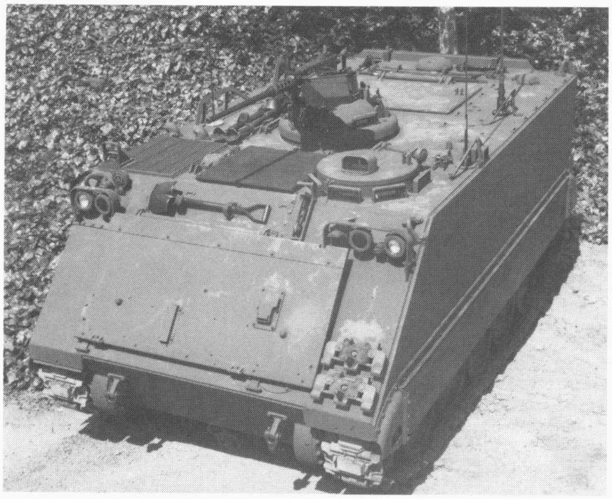
In the Pacific war zone American forces faced a tactical problem which could not have been foreseen. Many of the Japanese-held islands were girdled by coral reefs which prevented conventional landing craft from reaching the shore proper; and even if the craft could be grounded on the reef itself, and the lagoon between it and the shore was suitably shallow, this still meant that the landing force would have to wade a considerable distance in the teeth of the enemy's fire.

The LVT-5 series of 'amtracs' used by the USMC in Vietnam included five major versions, giving a personnel, command, engineer and recovery capability to the two amphibious tractor battalions of III MAF. These photos show LVTP-5A1 personnel carriers of 1st Amphib. Tractor Bn., 3rd Marine Div. moving off a beach and into woodland in May 1965 (below); and a command track—note extra aerials—of A Co., 'First Amtrac', off the coast of South Vietnam north of the Qua Viet River in September 1967. A significant difference of detail is that in the later picture the crew ride on the roof behind sandbag parapets. The USMC used the amtracs as APCs on shore, and found out the hard way that a mined road and 456 gallons of petrol tanked in the LVT's floor combined to produce a holocaust inside. (USMC)



Ostensibly the problem could not be solved without incurring prohibitive casualties, but an ingenious solution had already been provided by an engineer named Donald Roebling, of Clearwater, Florida. In 1936 Florida had been devastated by a series of disastrous hurricanes, and Roebling had designed a tracked amphibious vehicle named the Alligator which was capable of rescue and relief operations in marshy swampland that was otherwise impenetrable. The design's potential for amphibious warfare was soon noted by the United States Marine Corps, who originally intended to use it as an unarmoured ship-to-shore stores ferry, but quickly realised that an armoured version could claw its way over reefs, wade lagoons, and deposit riflemen in comparative safety on the shoreline. Furthermore, additional versions armed with heavy fire support weapons could not only play a decisive role in the suppression of local strongpoints, but could also accompany the advance inland until adequate tank support could be landed.

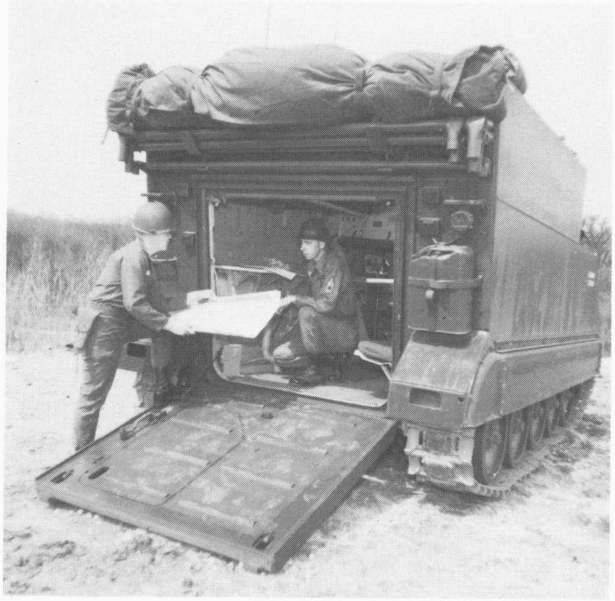
The Food Machinery Corporation of California undertook the final design and development programme, the vehicles being designated LVTs (Landing Vehicles Tracked) or Amtracs (Amphibious Tractors). As they became available they were issued to USMC Amtrac Battalions which then formed the spearhead of assault landings in the Pacific theatre. On the launching of the 10,000th LVT the FMC workforce was commended by Vice Adm. E. L. Cochrane, Chief of the United States Navy's Bureau of Ships, who commented that 'there is not the slightest shadow of doubt that the overwhelming victories of our forces at Tarawa, Kwajalein, Saipan, Tinian, Guam, Pelelieu and Iwo Jima could not have been possible without the Amtrac. It was only those that could navigate the coral reefs which the Japs thought were their sure defence.' Even so, it is a sobering thought that in the three days' fighting required to capture the tiny island of Betio in the Tarawa atoll the US Navy and Marine Corps together sustained no less than 3,000 casualties; had Amtracs not been used there is no knowing what the butcher's bill might have been, or whether such an assault would even have been contemplated. (Fuller details will be found in Vanguard 35, *Armour of the Pacific War.*)



M113A2 APC armed with a .5in Browning; note the ground mounting for this stowed on the roof left of the hatch. The M113 is the most widely used APC outside the Soviet Bloc. (FMC)

Large numbers of LVTs were also supplied to the British Army, who called them 'Buffaloes' in North-West Europe and 'Fantails' in Italy. The 79th Armd. Div. eventually contained five LVT regiments: 4 RTR, 11 RTR, 1st Northamptonshire Yeomanry, 1st East Riding Yeomanry, and 5th Assault Regiment Royal Engineers. Major LVT operations in North-West Europe included the clearance of the Scheldt estuary, which involved assault landings on South Beveland and Walcheren; Operation 'Veritable', the clearance of the Reichswald forest and the left bank of the Rhine; and Operation 'Plunder', the Rhine crossing on 21st Army Group's sector. During 'Veritable' the Germans breached their own dykes, submerging the flood plains under several feet of water so that villages and farms took on the aspect of defended islands which the 2nd Canadian Corps were sometimes obliged to storm from assault boats, covered by fire from the LVTs. The Rhine crossing itself was a model LVT operation involving 425 Buffaloes which made 3,842 craft-trips, the only losses sustained in this huge undertaking being nine vehicles written off and 55 damaged; four crewmen were killed and 36 wounded. 4 RTR crossed with their commanding officer's LVT flying the same flag with which the armoured cars of 17th Bn. The Tank Corps had led the advance to Cologne at the end of the First World War. Not to be outdone, 11 RTR ferried Winston Churchill, Field Marshal Montgomery, and a gaggle of Army and Corps commanders to the now secure enemy bank. Gathering the crews informally round him, the Prime Minister congratulated them and their vehicles on their achievements during the assault crossing. (Montgomery, for once completely relaxed, urged them to take advantage of the situation: 'Go on—ask him for a cigar!')

Interior detail of the M577A1 Command Post version of the M113, with a raised roof giving increased space. This can be extended by erecting the canvas canopy which is seen here stowed with its supporting frame at the rear of the vehicle. (FMC)



In Italy the 8th Army's LVT regiment was a provisional organisation formed from 9th Armoured Brigade's tank drivers and interested Royal Army Service Corps personnel. Its most celebrated action took place in April 1945 and resulted in the forcing of the Argenta Gap, the last obstacle separating the 8th Army from the open plains of Lombardy. The Gap itself was a strip of heavily fortified land lying between Lake Comacchio and the swamps of the Massa Lombarda. Far from offering protection to the German flank, Lake Comacchio presented the British with a means of turning it. In two connected operations, 'Impact Plain' and 'Impact Royal', the LVTs lifted the 56th Div. and No 9 Commando across the lake to carry out assault landings in the enemy's rear. Simultaneously, the remainder of the British V Corps struck a heavy blow at the Germans' prepared defences, using specialised armour, Churchill 'I' tanks and Kangaroos. The front collapsed, and the

6th Armd. Div. flooded through the Gap and out into open country. The whole enemy line was now unhinged and forced to withdraw under pressure from the Allied armies. Only 17 days after the start of 'Impact Plain' the German High Command in Italy surrendered.

No such subtlety was ever evinced by the Red Army in the handling of its Motor Rifle troops, for whom there were no APCs and, at best, only an inadequate number of lorries available. Given the primitive Russian command and control apparatus, coupled with the centralised decision-making process, it was inevitable that the Red Army should rely upon massive and carefully rehearsed set-piece all-arms attacks which, if they did not succeed, were bloodily repeated over the same ground until either they did, or the assault formations were simply used up. All armies used tanks to lift infantry into their assembly areas, but only the Soviets chose to lead their assaults with a battalion of sub-machine gunners, sometimes referred to as 'tank marines', actually riding on them; predictably, the life expectancy of such men was tragically short.

That the Wehrmacht was able to inflict such horrific casualties and offer a coherent defence for so long stemmed directly from its ability to separate the Russian tank spearhead from the mass of dismounted infantry following behind, using artillery fire and air strikes for the purpose. Lacking infantry with which to suppress the anti-tank gun screens, the tanks were shot to pieces; lacking tanks with which to eliminate the German machine-gunners, the infantry were slaughtered whether they chose to advance, retire or stay put. (An interesting account of this defensive technique in action can be found on pp. 18-19 of Vanguard No 12, *Sturmartillerie and Panzerjäger*.)

The lack of APCs was undoubtedly a major contributory factor to the carnage suffered by the Red Army, but that lack in itself is not an excuse. Russian general officers and staffs, having personally witnessed the German Panzergrenadiers in action and observed on newsreels the similar techniques used by the British and American armies, must have been fully aware of the APC's potential. Why, then, were not a proportion of T-34 chassis, production figures for which were climbing beyond strict necessity, diverted to the Kangaroo role? Such a course made sound military economic sense, since without direct infantry support those same chassis were being pounded to scrap by the German PAK-fronts. The idea presented such an obvious escape route from a painful dilemma that it is certain to have been put forward. Equally certain is the fact that it was rejected by powerfully placed individuals within the Soviet military-political hierarchy, who may have fancied they saw again the stirring of the nascent Praetorianism which had preceded the Great Purge. In the end, it was the Russian soldier who paid the price.

The British Spartan light APC, part of a rationalised series of air-portable AFVs built by Alvis; the ground pressure of the tracks is less than half that of a walking man. (Alvis)

The Soviet Union did, in fact, receive a quantity of American half-track APCs under the terms of the Lend-Lease Agreement, but these represented only a tiny fraction of the Red Army's potential requirements, and were retained for use by the headquarters staff of higher armoured formations.

Mechanised Infantry since 1945

Trends in APC Design

After their experience in the Second World War no army could afford to neglect its mechanised infantry arm, and it was within the decade immediately following the war that the concept of the modern MICV (Mechanised Infantry Combat Vehicle) or

IFV (Infantry Fighting Vehicle) began to take shape. For a while the M3 half-track remained the world's most widely used APC, and indeed it still finds employment in this role in some armies. However, other factors were at work which made the demise of the open-topped half-track in first rate armies inevitable.

Firstly, the general improvement in the tank's cross-country performance meant that half-tracked APCs would have difficulty in keeping up. The answer was to build APCs on fully-tracked or on purpose-built wheeled chassis which gave them a comparable mobility. Secondly, the proliferation of nuclear, biological and chemical (NBC) weapons meant that the occupants of APCs would have to be fully enclosed to obtain the maximum possible protection. Thirdly, the success of American and British LVT operations confirmed the need for the continued development of this class of fighting vehicle, and also the benefits which would accrue if all APCs were to be given an amphibious capability. Fourthly, the process in which the old Imperial powers granted independence to their former colonies was aggravated by the intervention of local political groups who wished to seize power for themselves, the ambush of security forces becoming commonplace. To counter this APCs were fitted with at least one heavy automatic weapon in a protected mounting and the occupants were provided with firing ports, so reviving the concept of mounted action.

Finally came the realisation that with all major armies now using APCs like would certainly meet like on the battlefield and must be given the ability to destroy its own kind, either by means of ATGW or with kinetic- or chemical-energy ammunition.

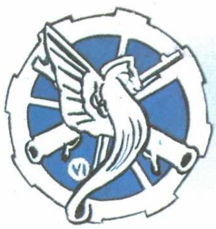
In the light of this, therefore, the ideal APC design should possess a mobility equal to the tanks with which it is to operate; protect its passengers against heavy machine gun fire, shell splinters and NBC hazards; possess an amphibious capability; provide facilities for mounted action; and be capable of destroying other APCs and, in appropriate circumstances, main battle tanks.

A further factor which influences APC/LVT specifications is the size of the tactical infantry unit to be carried. The normal infantry platoon consists of three rifle sections each of 8 to 10 men, plus a comparably sized headquarters section. It follows, therefore, that the APC should be designed to carry either a full platoon or a single section. The problem with platoon-sized vehicles is that they tend to offer a large target and, if they are penetrated, casualties among their occupants tend to be very severe. The majority of users, therefore, have opted for smaller section-sized vehicles.

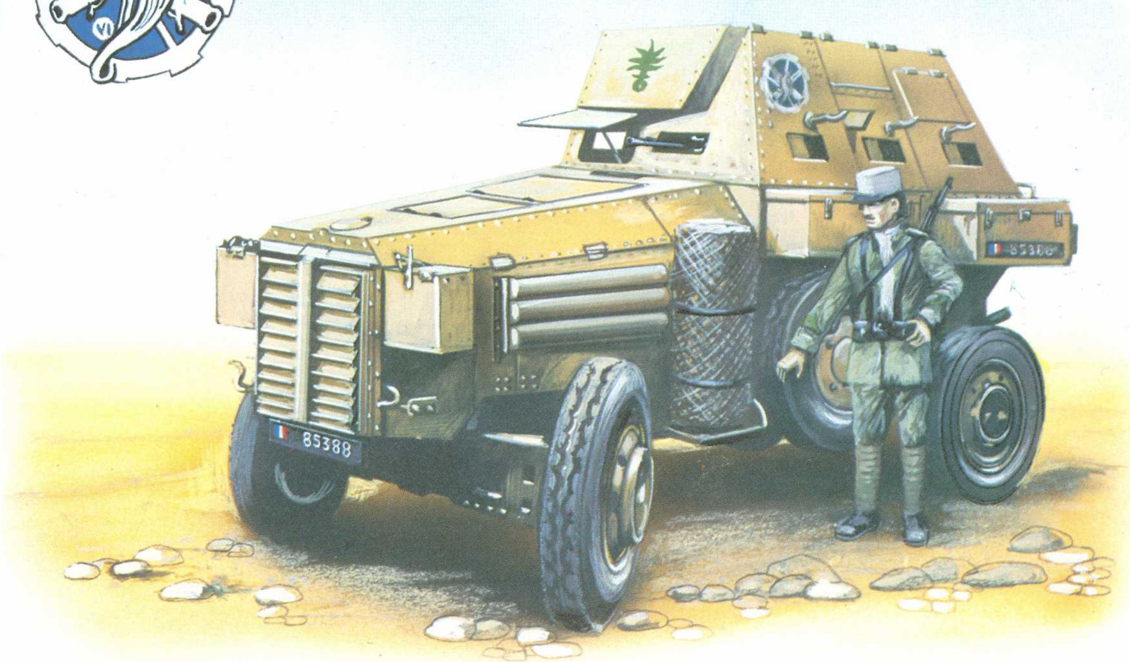
It is difficult enough for designers to incorporate these various elements within the parameters of weight, size, speed and armoured protection specified as being desirable; all AFV design is subject to compromises in which certain characteristics deemed essential are included at the expense of others thought less so. As if this were not enough, the very point at which the design commences—the space required by one infantryman in full battle order, multiplied by the number of such infantrymen to be carried—is complicated by the human race's perverse refusal to renew itself in a standard shape and size. Western designers allow for large men capable of absorbing a reasonable degree of discomfort, and regard smaller passengers as a bonus; their Soviet counterparts, on the other hand, reflect the Communist theology in that they design vehicles to suit themselves and then look round for men small enough to stuff into them.

These human engineering aspects of APC design are extremely important. It is, after all, asking a great deal of even the fittest individual that he should remain for several hours inside a jolting steel box and then be required to perform at the peak of physical efficiency. Much has been learned regarding the effects of heat, fumes, noise and movement, each of which induce fatigue. A vehicle with a proportionately short track-base, for example, will pitch continuously when moving across country, thereby disturbing the balance of the inner ear and so inducing nausea; in other words, its occupants begin to suffer from seasickness. The British FV432 is a notable offender in this respect, and the Russian BMP is a claustrophobic's nightmare, as well as being cramped and extremely uncomfortable. There is, therefore, no point at all in designing the perfect theoretical APC if its occupants are to arrive at their moment of truth in no condition to fight.

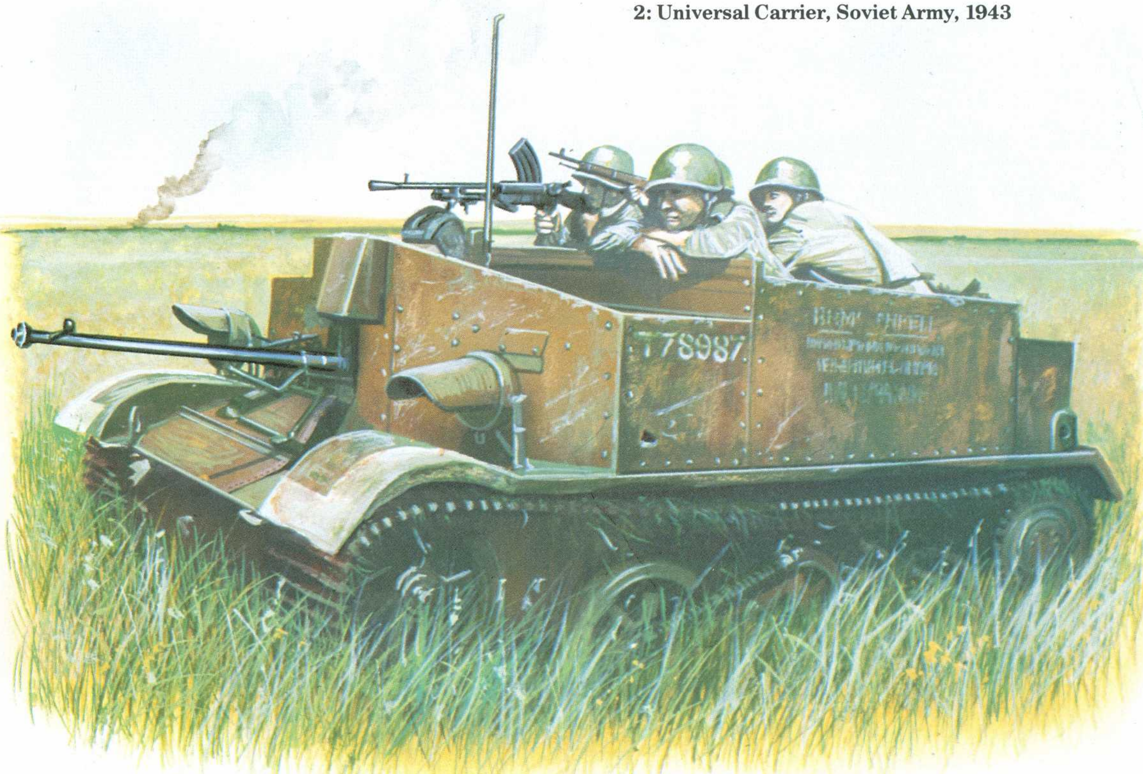
The United States Army's first enclosed fully-tracked APC, the M44, entered service only months after the end of the Second World War. This vehicle



1: Berliet VUDB, 6^{e} Esc., 1er REC; Morocco, 1930-34

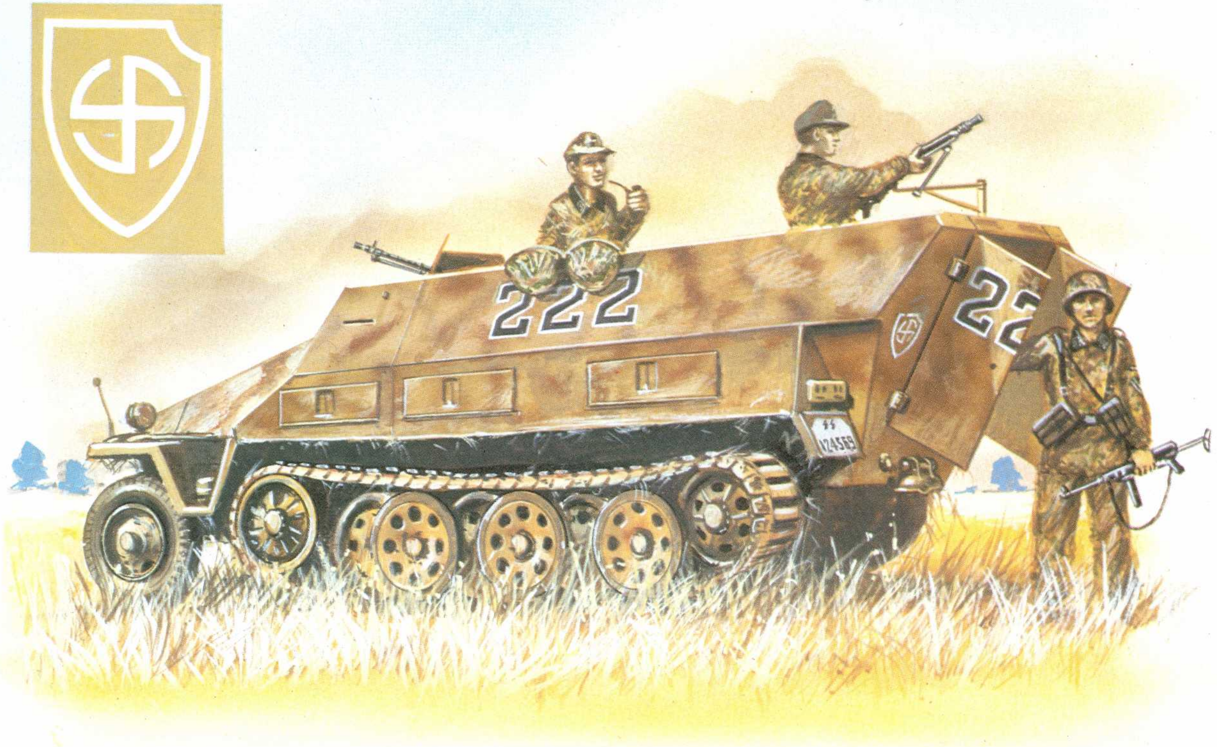


2: Universal Carrier, Soviet Army, 1943

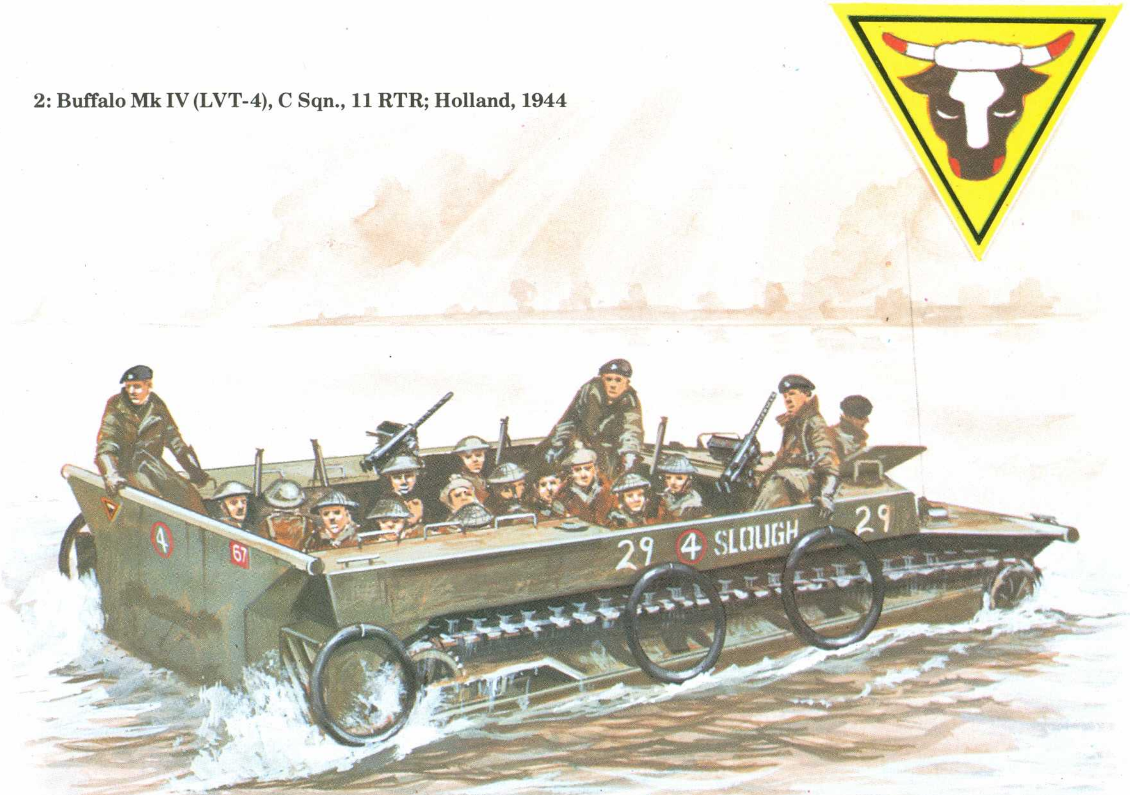


A

1: SdKfz 251/1 Ausf. D, 5.SS-Pz-Div. 'Wiking'; Poland, 1944



2: Buffalo Mk IV (LVT-4), C Sqn., 11 RTR; Holland, 1944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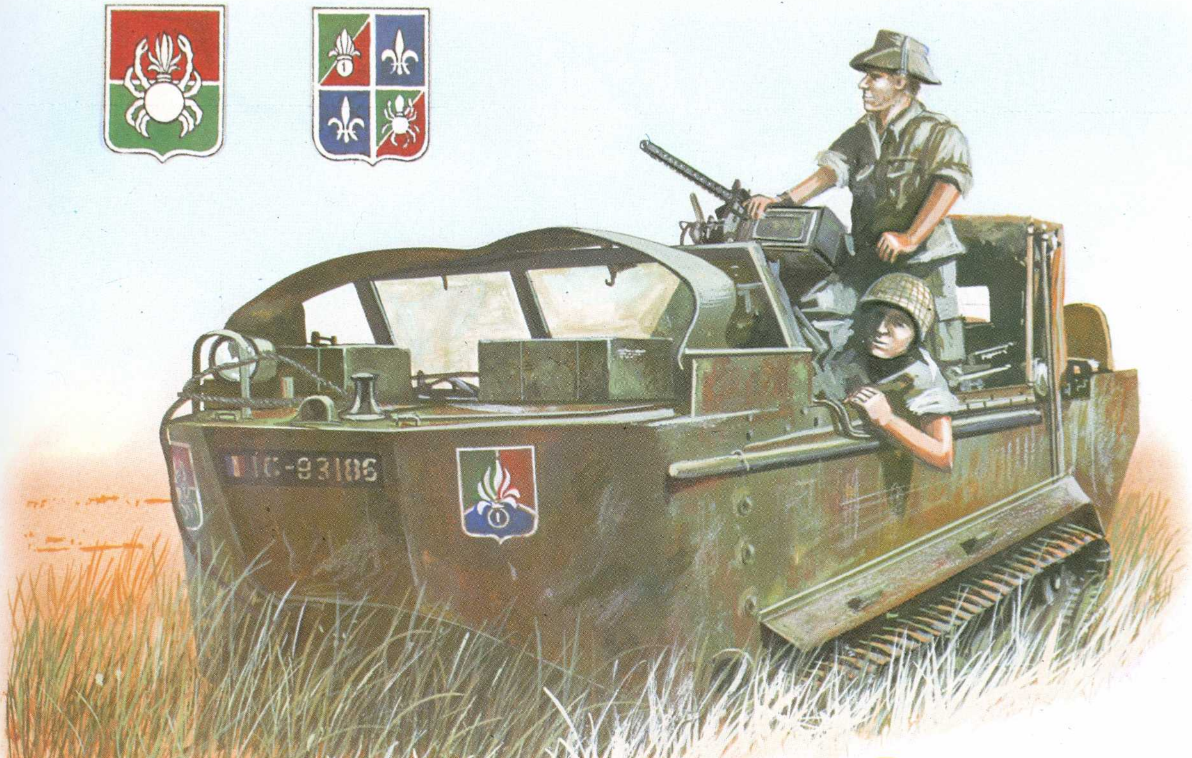
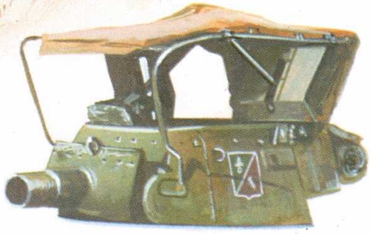
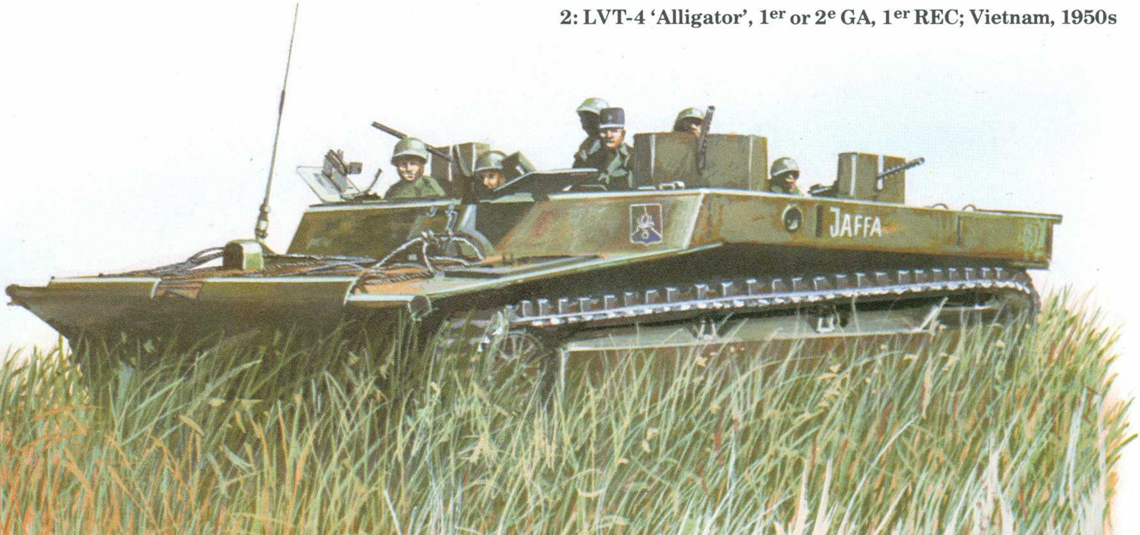


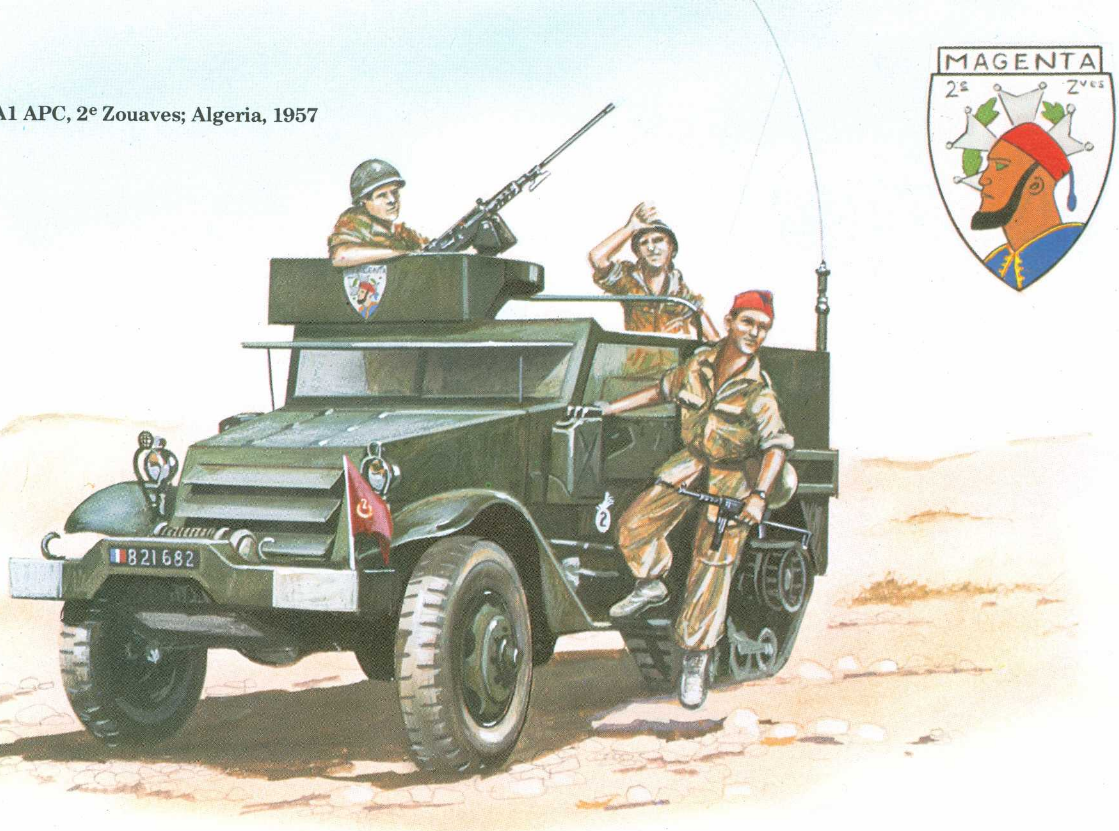
1: M29C 'Crabe' 1er GA, 1er REC; Annam, 1952



2: LVT-4 'Alligator', 1er or 2e GA, 1er REC; Vietnam, 1950s



1: M3A1 APC, 2^e Zouaves; Algeria, 1957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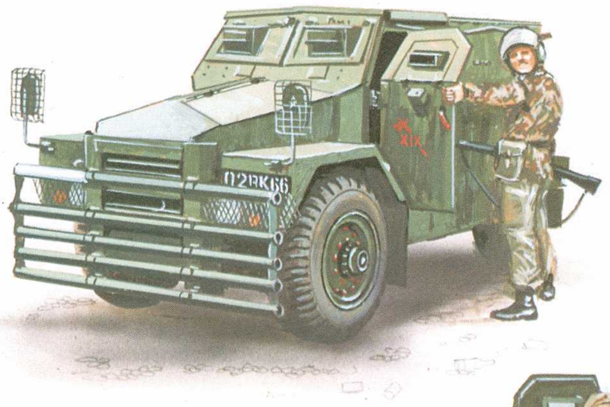
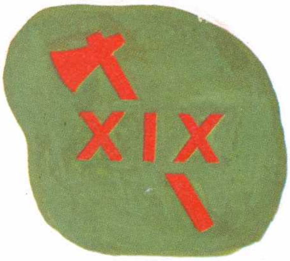
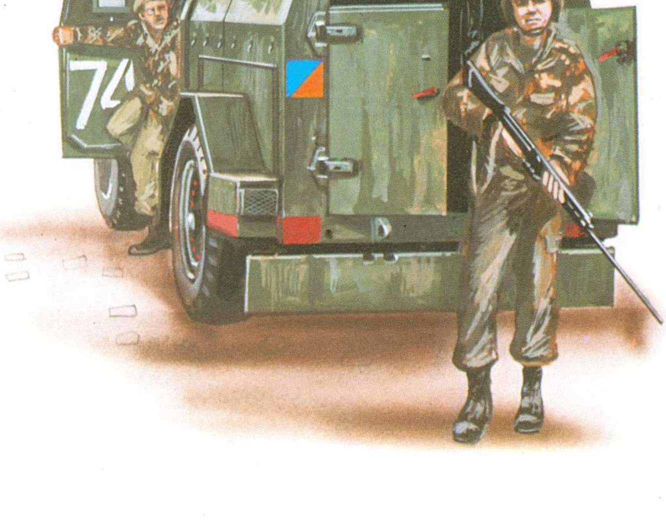
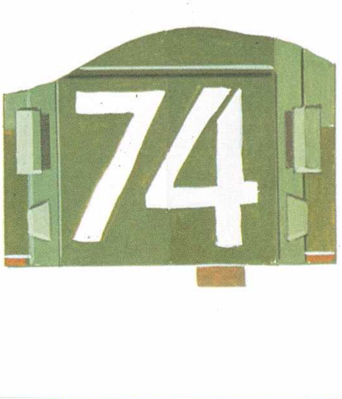




2, 3: Humber 'Pig', 19 Co., RCT; Belfast, 1981





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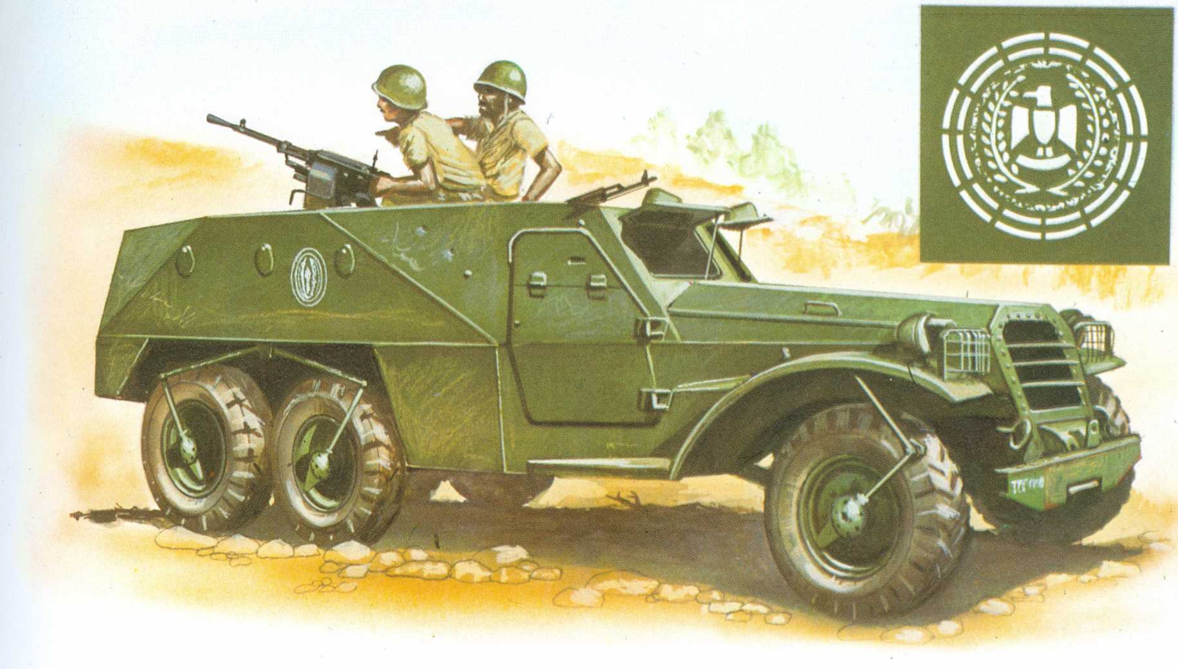
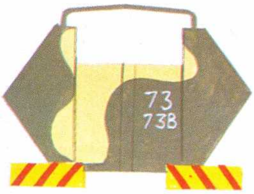
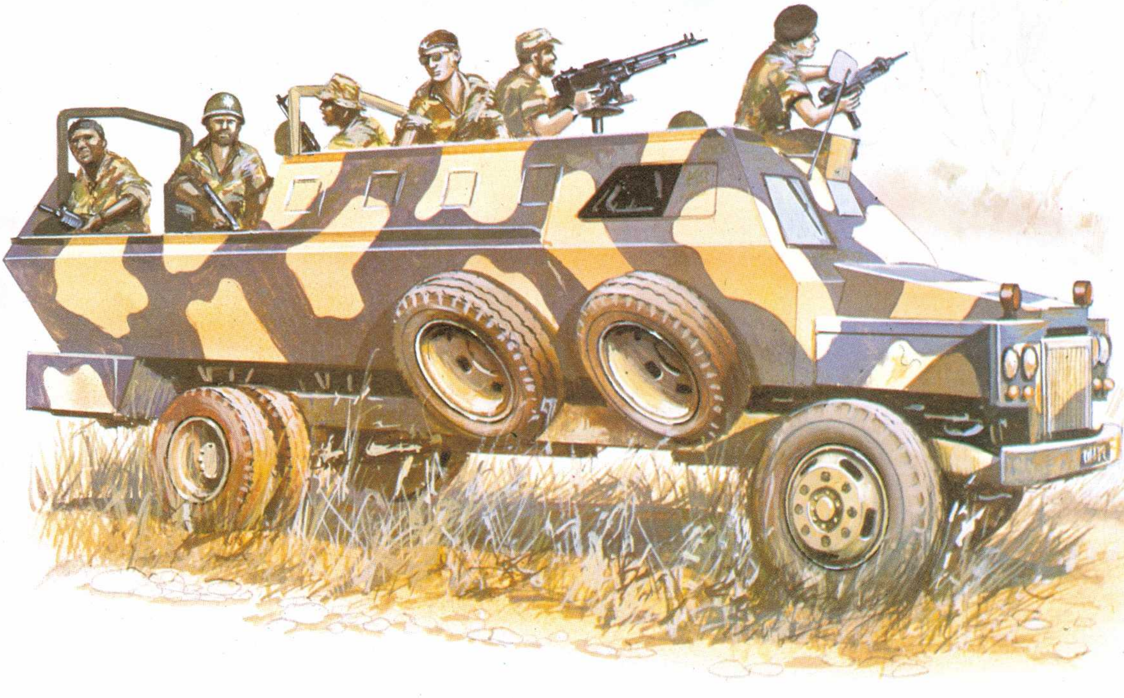




1: BTR-152 V1, Syrian 17th Mech. Bde.; Golan Heights, 1967

2: 'Crocodile' APC, Rhodesian Armoured Corps; Mozambique, 1979



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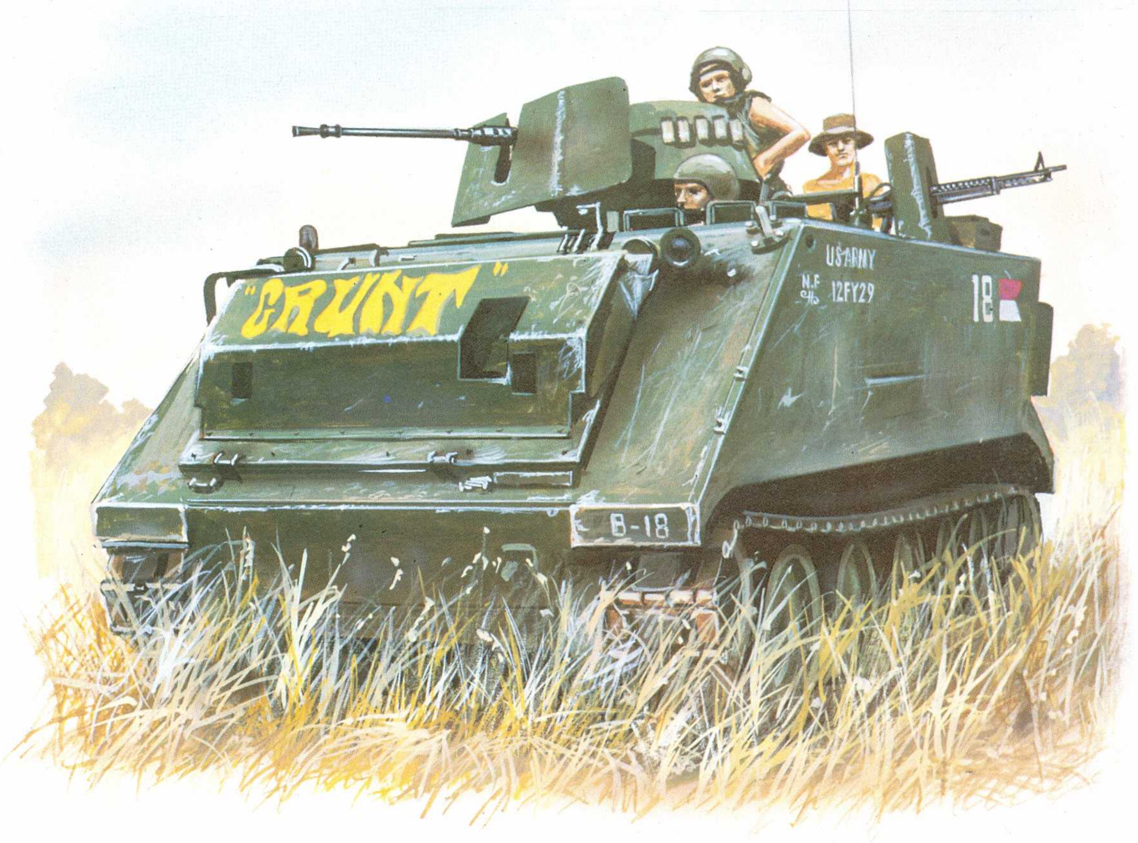
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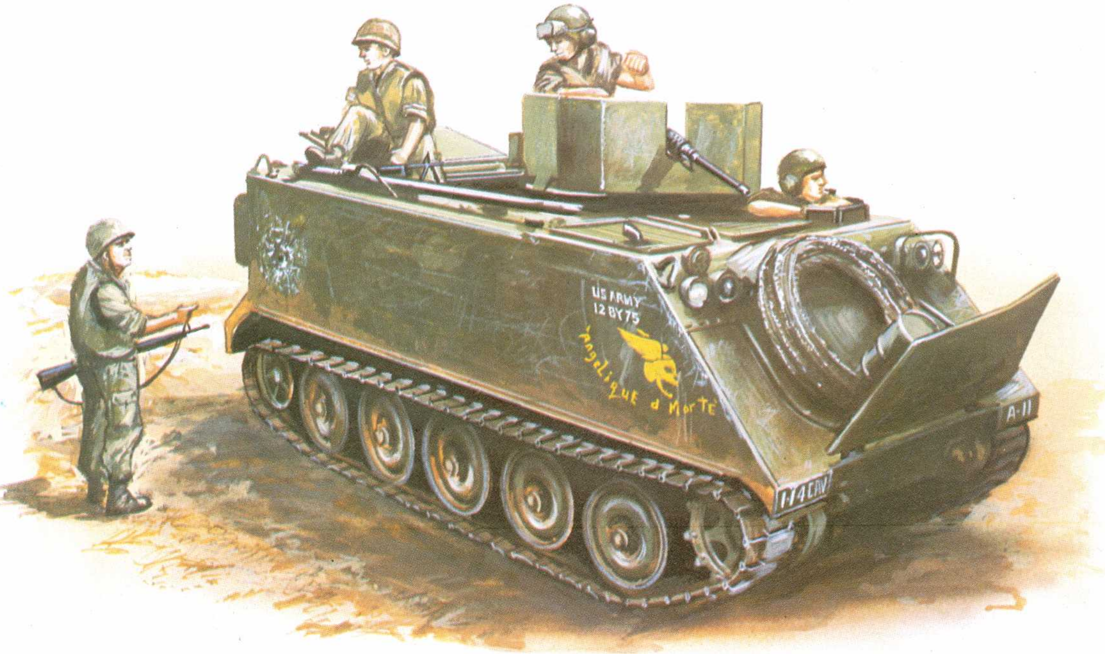
1: M113 ACAV, 1/10th Cavalry; II CTZ, Vietnam, 1971

2: M113 ACAV, 1/4th Cavalry; III CTZ, Vietnam, 1967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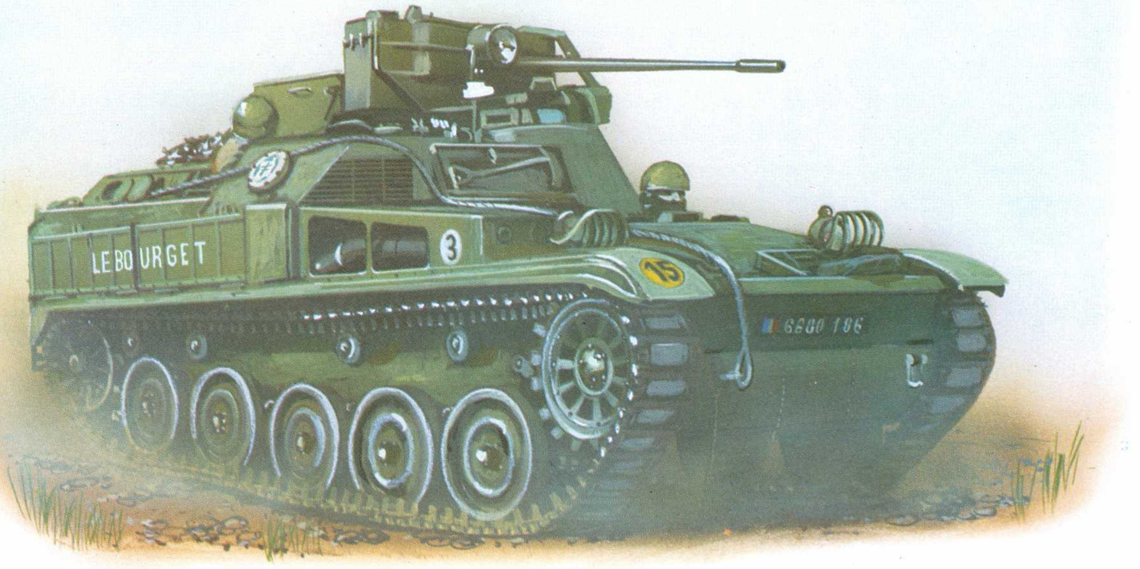
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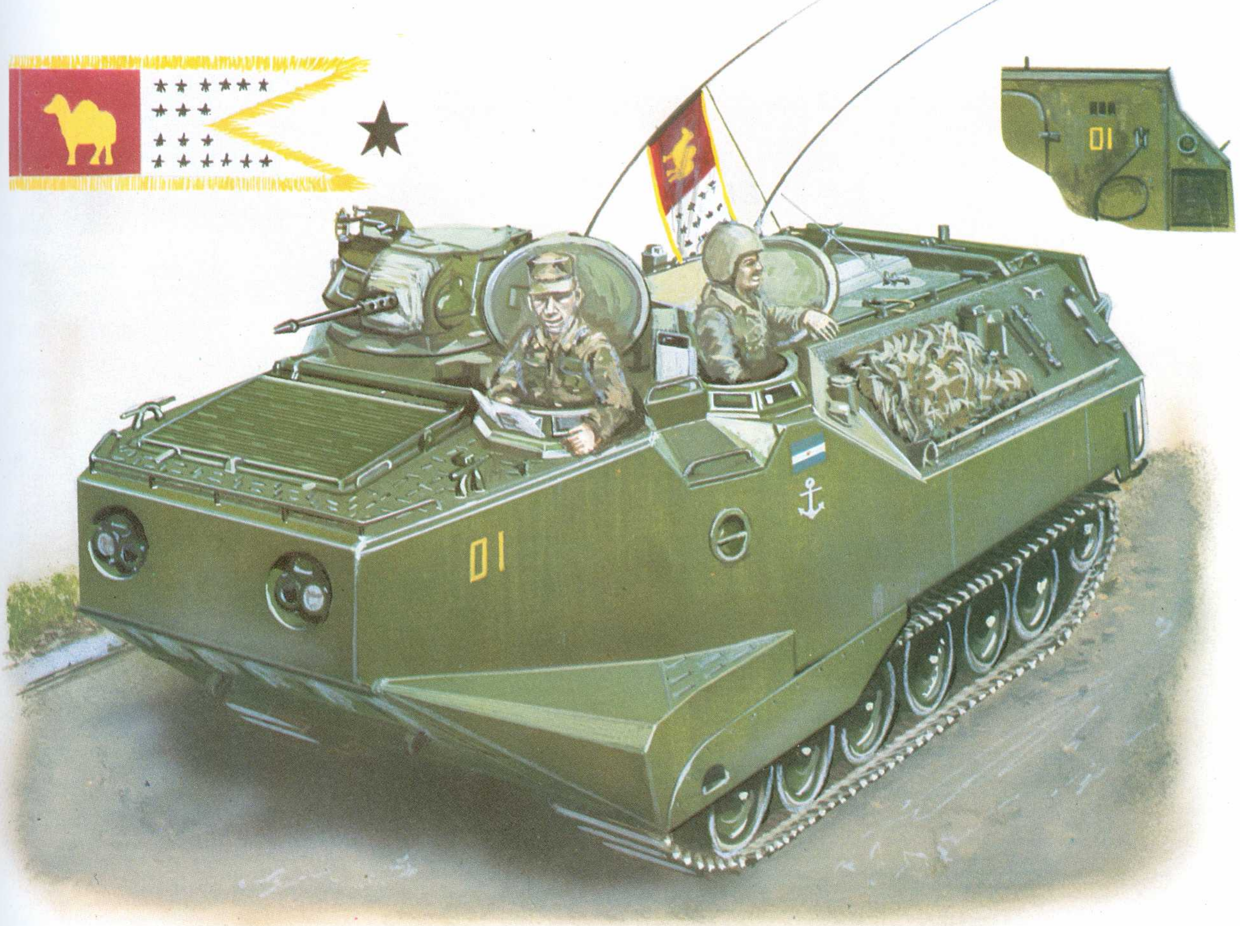
1: AMX-VTT, RMT, 2ᵉ Division Blindée; France, 1980

2: LVTP-7, Argentine 1st Amphib. Veh. Bn.; Falklands, 1982



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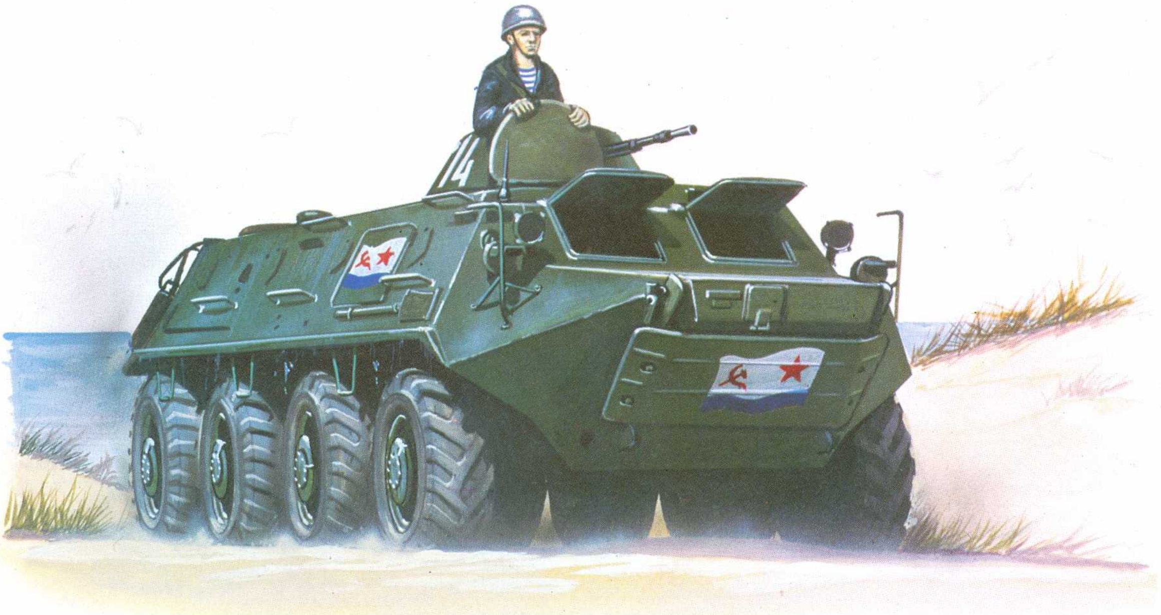
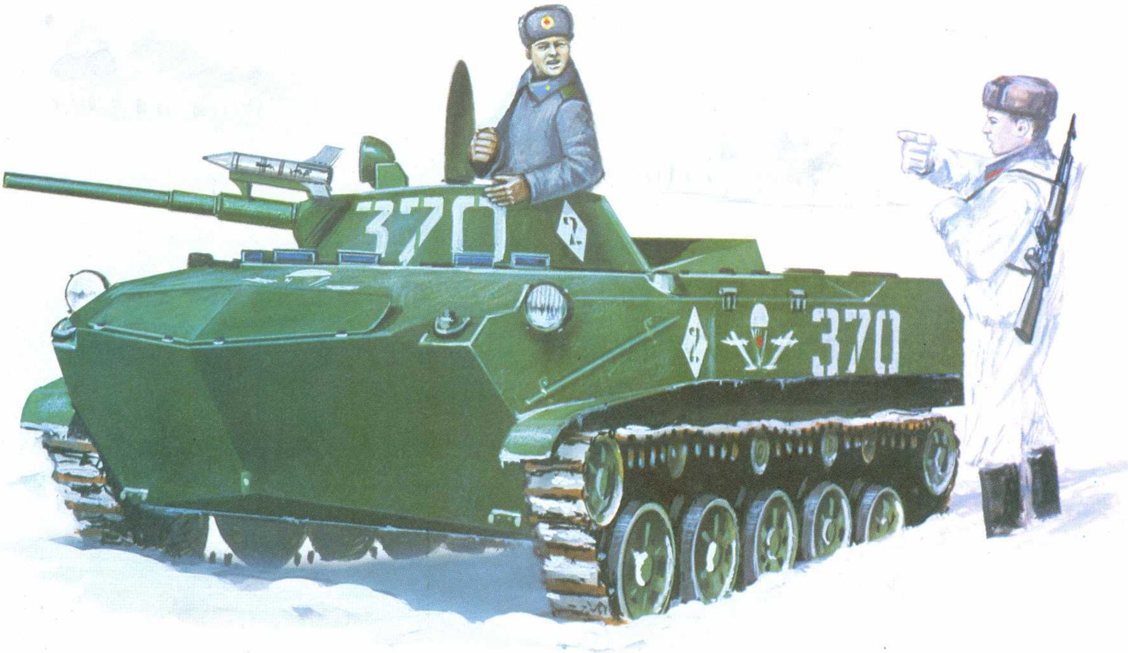


1: BTR-60PB amphib. APC, Soviet Marines, 1970s

2: BMD-1 APC, Soviet 105th Airborne Div.; Afghanistan, 1982



H

employed the chassis of the M18 tank destroyer and established the basic shape of the majority of Western APCs—an armoured box with a sloped glacis plate and rear access doors. Unfortunately, the M44 was over-large for its task and its payload of 27 infantrymen fell awkwardly between the requirements of platoon and section tactics. Comparatively few were built.

The M75, which appeared in 1951, was based on the M41 light tank chassis and carried an infantry section. It saw active service during the Korean War (as, of course, did the older M3 half-tracks) but was replaced in due course by the FMC Corporation's M59 amphibious APC, which offered obvious advantages. The M59, however, possessed a number of inherent defects which revealed themselves in use, being under-powered for its 18-ton weight as well as producing excessive interior heat and noise. These undesirable features were eliminated by FMC in their design for the M59's replacement, the M113, which weighs only 10 tons, is almost a foot lower, and incorporates aluminium alloy armour in its construction.

The M113 APC entered service in 1960 and since then no less than 60,000 have been built and supplied to armies around the world, making it the most numerous AFV in use outside the Soviet bloc. The vehicle's capacity for mounted action has been progressively improved and it is employed in numerous roles in addition to that of APC, including mortar carrier, flame thrower, command post and cargo carrier, to name but a few. It can also be adapted for use with a variety of weapon systems and turrets for use in the fire support/anti-APC role. This remarkable success story is fully discussed in Vanguard No 34, *The M113 Series.*

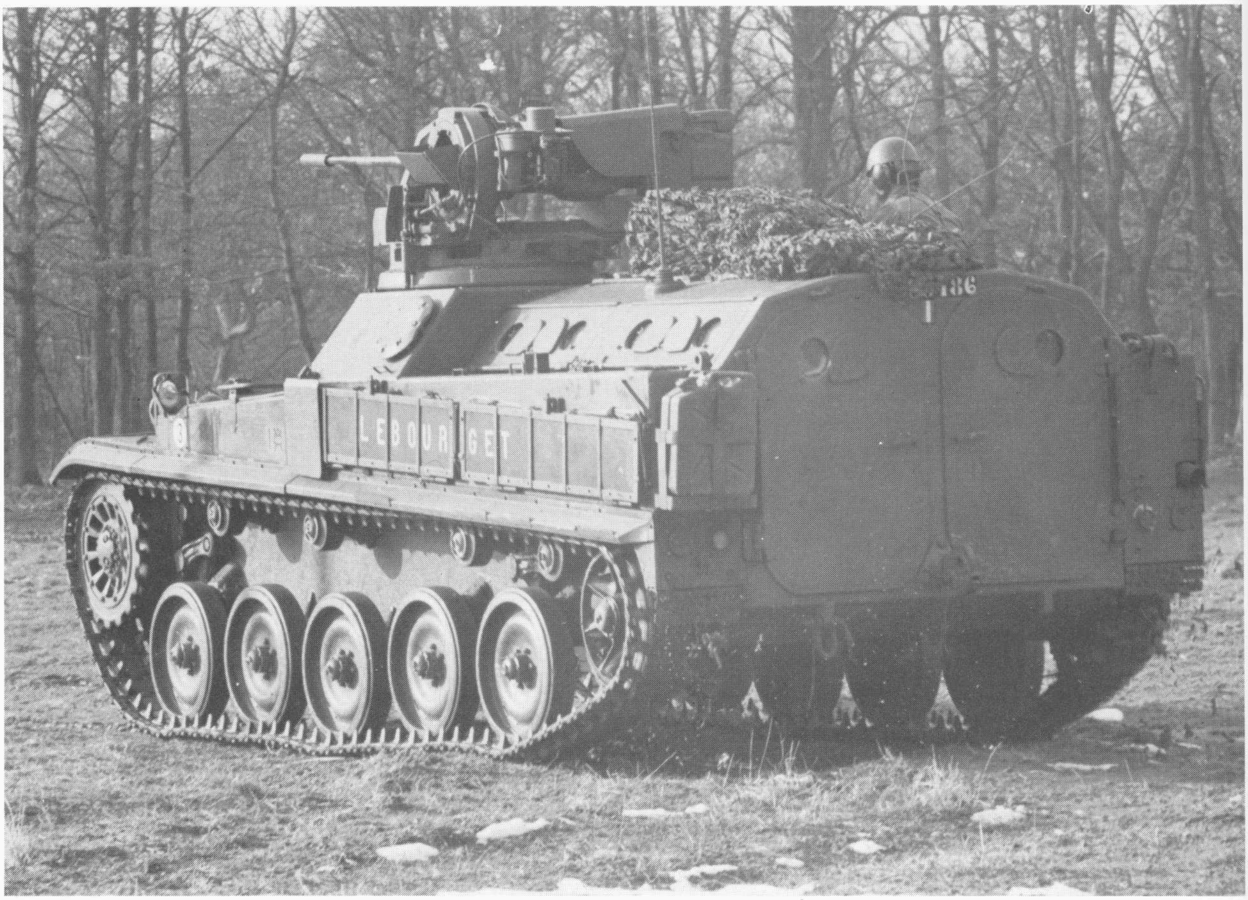
The AIFV (Armoured Infantry Fighting Vehicle) is a natural evolution of the M113 and is already being issued to the US Army as it leaves the FMC plant. Its design includes spaced laminate armour and a turret mounting a 25mm dual-purpose cannon and a 7.62mm co-axial machine gun. The vehicle has a maximum speed of 38mph (3.9mph when swimming) and is manned by a crew consisting of commander, gunner and driver. A seven-man infantry section is carried, for whom five firing ports are provided.

In the field of LVTs progress has been less dramatic, successive designs tending to reflect sustained improvement on the original amtrac concept, as well as the incorporation of modern technology. The USMC's tactical requirements being somewhat different from those of the Army, the corps prefers larger carriers. The LVTP-7 at present in service can carry up to 25 combat-equipped riflemen, as did its predecessor in the Vietnam War, the LVTP-5.

The British Army abandoned its Kangaroos in the immediate post-war years, there being general agreement that they were an expensive solution to a problem which was no longer pressing, and also required too much maintenance for their role. The M3 half-track was retained for a while, but was phased out in favour of the Saracen, a six-wheeled APC the development of which was accelerated by the Malayan Emergency and which began entering service with British armoured formations in 1952. The Saracen remains active to this day in the internal security role, as does a smaller four-wheeled APC, the FV 1611; the latter is better known as 'The Pig', a title conferred because of its appearance rather than any historical connection with the Tank Mark IX.

The Saracen fulfilled many of the essential requirements of an APC, but its performance across country rendered it more suitable for the local reinforcement of tanks than for the sustained co-operation with them which only a fully-tracked carrier can provide. After studying the M113, it was decided to build a similar vehicle for British use and this, the FV 432, began leaving the production lines in 1963, and has been in service ever since. A quickly-erected floatation screen provides an amphibious capability and the vehicle has been adapted for various roles including command post, recovery, ATGW launcher, mortar carrier and artillery observation. Other British APCs in production include the Spartan, a light APC, and the larger Stormer, which also employ floatation screens for water crossing. Both these vehicles are derivatives of the Scorpion light tank series, the latter having a lengthened chassis; both, too, are air-transportable, two being carried aboard a C-130 Hercules transport aircraft. In addition, the Stormer can be adapted for use with a variety of turrets, weapon systems and engineering devices.

A new infantry fighting vehicle, the MCV-80, is due to enter service in 1984, progressively replacing



Two views of the French AMX-VTT—this is LE BOURGET of the 2^eDB, featured in Plate G1; the name recalls one of this regiment's battle-honours in September 1944. Note the small arms ports along the hull side and in the rear doors: the troops are seated in two rows, back to back. (ECPA)

the FV432. This vehicle carries a full infantry section and in layout is similar to the American AIFV, but employs a two-man turret mounting a 30mm Rarden cannon and a co-axial 7.62mm machine gun.

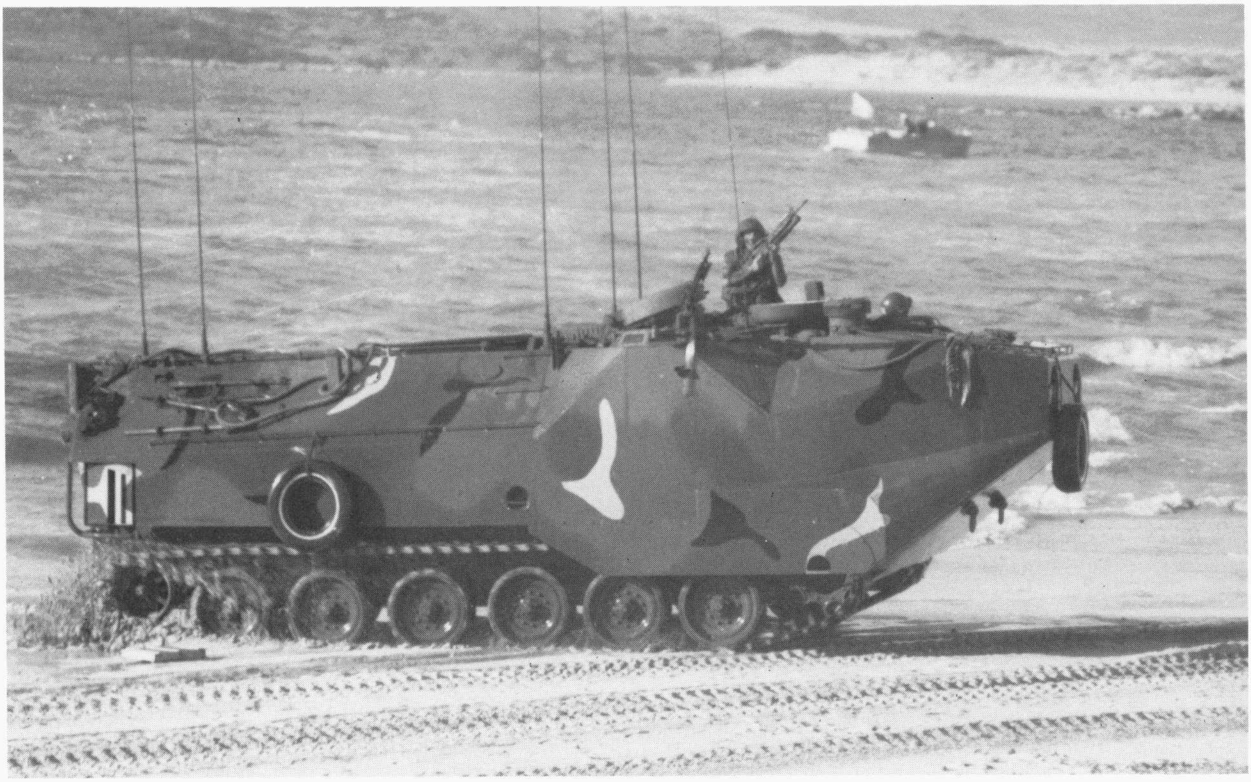
The French Army began its own series of colonial counter-insurgency wars using M3 half-tracks and British Universal Carriers; for service in Algeria it also converted a number of eight-wheeled EBR armoured car chassis to the APC role. The small Hotchkiss TT6 was also used for a while, but the first post-war tracked French APC, the AMX-VTT (*Vehicule Transport de Troupes*) entered service in 1956, employing the AMX 13 light tank chassis, and is still active. The AMX-VTT was later supplemented by the fully amphibious AMX 10 series, which can be converted to IFV standard by fitting a variety of turrets, including one mounting a 90mm gun, and by a four-wheeled APC, the VAB.

The Bundeswehr's first tracked APC, the Spz 12-3, entered service in 1959 and reflected the Panzergrenadier tradition of going into action by vaulting over the vehicle's side, although the design also included a forward-mounted turret armed with a 20mm automatic cannon. The vehicle intended to replace the Spz 12-3, as well as the Bundeswehr's M113 APCs, is the Marder, which has in fact replaced neither. Based on a tank destroyer chassis, the Marder is a section vehicle armed with a turret mounting a 20mm cannon and co-axial 7.62mm machine gun, with a second machine gun fitted to cover the rear. Designed with the best of intentions, the vehicle is indeed a formidable APC but has emerged as a series of contradictions. It weighs 25.5 tons, which is far too heavy for its task; it is taller than the Leopard tanks with which it is to operate; its maintenance and reliability factors compare with those of a tank rather than an APC; intended to snorkel its way submerged across river beds, its buoyancy is such that the tracks barely maintain contact with the bottom, yet it will not swim without external aids; it is also too expensive to be cost-effective, and therefore has few derivatives.

The post-war Soviet Army approached the subject of APCs with all the zeal of the newly converted, influenced not only by its analyses of the previous years' fighting but also by the realisation that of the world's major armies, it alone lacked an effective mechanised infantry arm. The BTR-40 ('BTR' standing for 'Armoured Personnel Transporter'), introduced in 1946, was an open-topped four-wheeled vehicle clearly based on the American White Scout Car; as an APC this left much to be desired, although it did lead to the development of the BRDM series of amphibious scout cars/ATGW carriers. The BTR-152, which appeared shortly after, was a much better vehicle and was based on the chassis of a six-wheeled truck. In layout it owed much to the German and American half-tracks of the Second World War, and inherited the angled hull armour of the SdKfz 251 series. Later versions were roofed with armour plate and fitted with a central pneumatic system which enabled the driver to alter tyre pressure to suit the going over which the vehicle was travelling.

A fully tracked amphibious APC, the BTR-50, was introduced in 1957. This was based on the chassis of the PT-76 light tank and was in essence an extension of the Kangaroo theme, the central fighting compartment being occupied by an infantry section, while the rear of the vehicle contains the engine and water propulsion units.

Four years later the BTR-50 was joined by another amphibious APC, the BTR-60. This vehicle employs an eight-wheeled suspension, all wheels being driven with power-assisted steering on the leading four. The boat-shaped hull and



The LVT-7 series is the latest generation of the 'amtrac' family to see service with the US Marine Corps, developed as a result of combat experience in Vietnam. This is the LVTC-7 command version, in service with the 2nd Marine Div. during 1977 NATO exercises in the Mediterranean; note current four-colour American AFV camouflage scheme. (USMC)

cutaway bow are excellent attributes in water, the vehicle being powered by hydrojet when afloat. The BTR-60 was, in fact, originally designed for use by the Soviet Naval Infantry Corps, but was also in general use throughout the Army, where it equipped the mechanised infantry battalions of the motor rifle divisions, while those of the tank divisions were carried in BTR-50s.

Thus far, there had been nothing particularly inspired about Soviet APC design, although the vehicles themselves were suitable for modification, improvement and conversion to a variety of roles. The decision to build an IFV with which to accompany a new generation of faster main battle tanks was, nonetheless, taken at a surprisingly early date; indeed, the first appearance of the BMP (*Boiennaia Machina Piekhoty*, 'Infantry Combat Vehicle') during the 1967 parades held to commemorate the 50th anniversary of the Bolshevik coup revealed a serious gap in the NATO order of battle.

Superficially the BMP represents the ideal IFV design. It has a low silhouette, is amphibious and fast; it is armed with a 73mm smooth-bore gun firing a range of ammunition, a co-axial 7.62mm machine gun and ATGWs; and it provides ample opportunity for mounted action. This combination has, however, been obtained at the expense of an extremely cramped interior in which the infantry section sit hunched among poorly protected ammunition bins and fuel tanks—fuel is even carried within the hollows of the rear access doors—which will render the vehicle a death trap if penetrated.

The BMD (*Boiennaia Machina Desantnaya*, 'Airborne Combat Vehicle') entered service in 1973 and is a smaller version of the BMP developed for use by the Soviet airborne forces. It can either be para-dropped or air-landed from an Antonov transport aircraft, and is also fully amphibious. It is similarly armed to the BMP, but carries only six infantrymen as opposed to the latter's eight.

This summary of APC development since 1945 has concentrated on those vehicles in service with the armies of the major powers. There are, of course, many others, including the Dutch eight-wheeled DAF YP-408, the Austrian Saurer and the Swedish

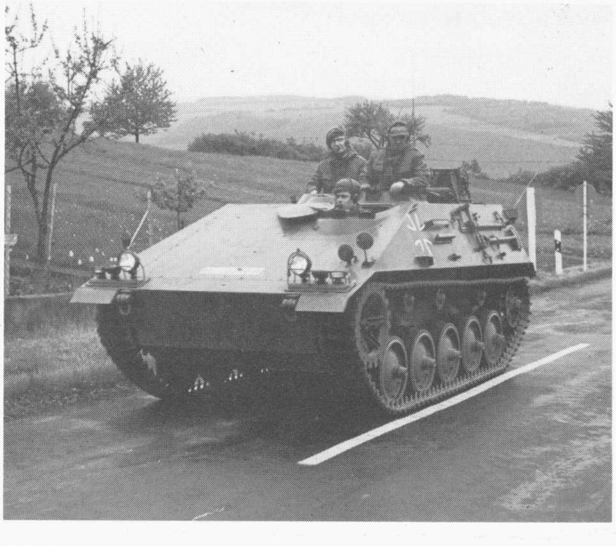
Pbv 302A, both tracked, all of which contain interesting features; armaments manufacturers also offer a variety of products, both wheeled and tracked, for battlefield use or counter-insurgency operations, but space considerations inhibit a full discussion of these within this study.

Mechanised Infantry Operations since 1945

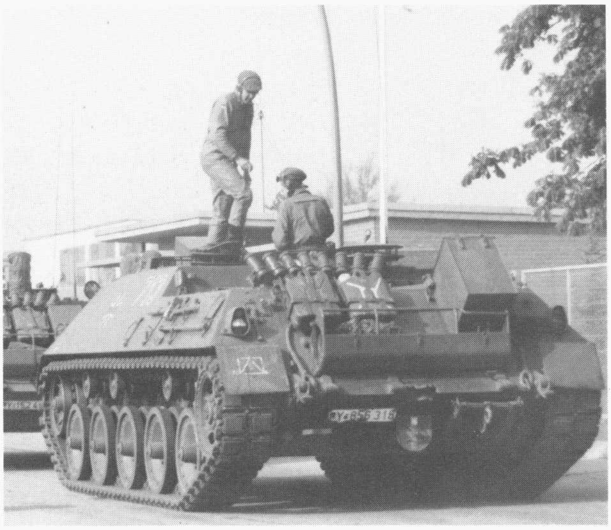
The basic roles of mechanised infantry remain constant, but the universal introduction of the APC has led to a general acceleration in the tempo at which operations are conducted. Significantly, this is less apparent in armies which employ Soviet equipment and methods, partly because of the reliance still placed on detailed pre-planning and partly because of the stiffness inherent in the Russian command, control and communications apparatus. Further factors which have influenced APC operations are the introduction of the ATGW, and an almost continuous series of counter-insurgency situations of varying intensity.

The infant Israeli Defence Force, lacking tanks and critically short of artillery, relied heavily on mechanised infantry during its 1948–49 War of Independence. The few M3 half-tracks available were supplemented by locally armoured buses, trucks and indeed anything which would support the increased weight and still move. The mobility and limited protection conferred enabled commanders to commit their slender reserves where they were needed most urgently. Many of these movements took place over long distances, the troops involved arriving in the very nick of time; but somehow, against probability, the line held. All this was eclipsed by the dramatic tank-led victories of 1956 and 1967, following which the IDF appeared to lose interest in its mechanised infantry, reducing the proportion of APCs to tanks within its armoured formations to one to three. In consequence, the first Israeli armoured counter-attacks of the Yom Kippur War were shot to tatters by the infantry-manned ATGW screen which the Egyptians had deployed to cover their crossing of the Suez Canal. The proportion was quickly restored to one to one, the APCs being the M3 half-track, the M113 (known in Israeli service as Zelda) and various captured Russian vehicles, so that when the tanks next advanced they did so behind a curtain of automatic fire from their mechanised infantry, supplemented by artillery preparation, the whole conspiring to reduce the most hardened ATGW operator to impotence. These incidents served to emphasise the primary lesson of the Second World War, that balance within any armoured formation is an absolute necessity. (See also Vanguard 19, *Armour of the Middle East Wars 1948–78*.)

Counter-insurgency operations involving mechanised infantry fall under two main headings, urban and rural. In the former, containment with minimum force and the gradual erosion of the dissidents' popular support has always proved to be a better policy than bloody repression. To many civilians, any armoured vehicle travelling on tracks and armed with even the lightest weapon will always be a 'tank'; the wheeled APC, on the other hand, presents something of a puzzle, and denies dissident elements an emotive propaganda coup. For this reason the British Army's anti-terrorist operations in Ulster have always been conducted with wheeled APCs from which even the automatic weapons have been removed. By way of contrast, whenever popular discontent has expressed itself in Eastern Europe, as it did in the German



The Bundeswehr's Schutzenpanzer 11-2 evolved from the French Hotchkiss TT6 design. It performs in a variety of roles, including light APC, reconnaissance, mortar carrier, command vehicle, armoured ambulance, and artillery observation. (Bundesministerium der Verteidigung)



The Spz 12-3 (HS-30) is somewhat unusual in that its Panzergrenadier section rides in a compartment amidships and, contrary to normal contemporary practice, goes into action by vaulting over the side. Note smoke grenade dischargers on the rear of the engine compartment; a small turret mounting a 20mm cannon well forward is obscured in this view. (Bundesministerium)

Democratic Republic, Hungary and Czechoslovakia, the Soviet Army has not hesitated to use main battle tanks to restore order. That this has neither been forgotten nor forgiven seems, at last, to have penetrated the Kremlin's collective consciousness; during the recent disturbances in Poland, for example, the BTR-60 was much in evidence, but the tanks remained in their barracks.

In a protracted rural guerrilla campaign, such as that waged by the Communist forces in Vietnam, their opponents found themselves engaged in operations which hovered between high-intensity counter-insurgency and outright conventional war, and in these circumstances the additional mobility conferred by an amphibious tracked APC was a necessity. Here, the anti-Communist forces held the towns, cities and fortified bases in the countryside and strove to eliminate the Vietcong and North Vietnamese Army units between.

The APC generally had now been developed to a point where it was a more powerful fighting vehicle than the light tanks of the Second World War. Not surprisingly, therefore, the US Army chose the M113 not only for its mechanised infantry units, but for its armoured cavalry regiments as well. Briefly, the respective roles of the two types of unit can be summarised as follows:

Mechanised Infantry Infantry insertion, re-deployment and extraction; the provision of ready-reaction forces capable of going to the immediate assistance of units under enemy pressure.

Armoured Cavalry Route security; convoy protection and escort; reconnaissance; cordon and search operations; perimeter defence of fortified bases.

The development of armoured cavalry does not form part of this story, but on the Vietnamese battlefield the distinction between roles was inevitably blurred, each type of unit performing the other's functions as circumstances dictated.[1]

Success and failure in this war without fronts was reflected in the degree to which the country's road network was open for normal use. Naturally, the Communists did everything in their power to inhibit movement, making use of heavier and heavier mines and staging regular ambushes. Mines represented a considerable danger to the comparatively light M113s, so much so that their occupants preferred to ride outside when out of immediate contact with the enemy. With experience, APC crews learned to recognise stretches of road which were particularly vulnerable to mining and also the tell-tale disturbances in the road surface. Ambushes were expertly laid but were frequently defeated by adopting one of two counter-measures. If the road remained open, the APCs would motor through and double back onto the rear of the ambush force in a manoeuvre known as the 'cloverleaf'. Alternatively, if the way ahead was blocked by, say, a mined vehicle, the APCs would halt diagonally across the road, facing alternately left and right, and shoot it out with the ambushers using their automatic weapons, supported by the fire of riflemen from the vehicles' upper hatches; for obvious reasons, this method was called the 'herringbone'. Whatever the situation when an ambush was sprung, the immediate response of the APCs was heavy sustained automatic fire aimed at likely enemy positions; known as the 'mad minute', this enabled the column commander to make a general appreciation of the situation and also prevented the enemy exploiting his initial advantage. Dismounted action seldom took place within the immediate ambush zone: it was what the

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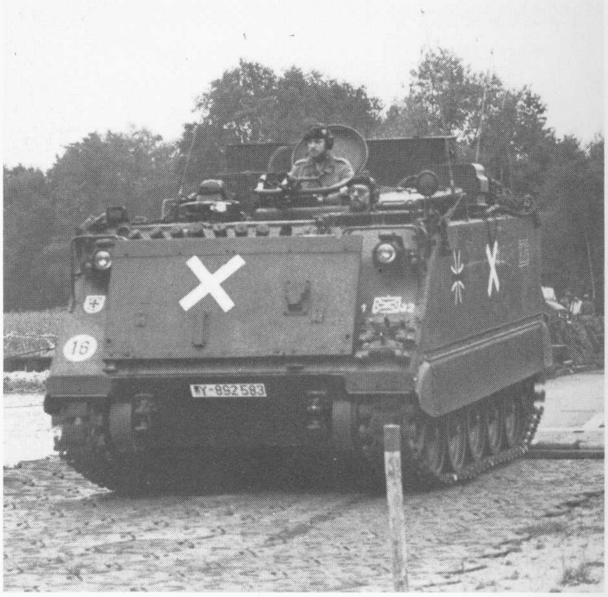
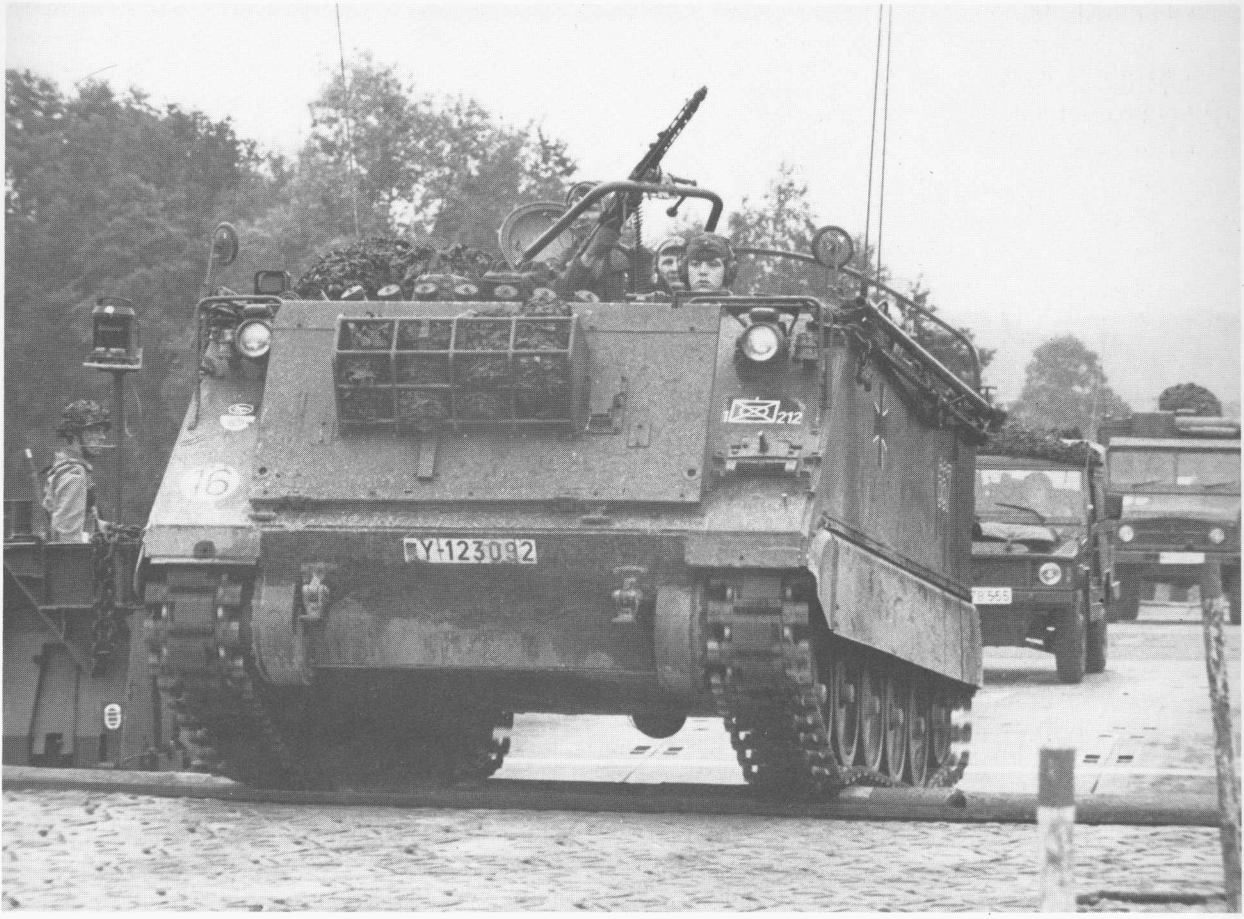
[1] The Armoured Cavalry Regiment contained tanks as well as APCs; a full description can be found in Simon Dunstan's *Vietnam Tracks*, Osprey, 1982.

Communists would have liked, since they usually covered the verges and ditches with anti-personnel mines and razor-sharp *panjis*, each capable of disembowelling a man or penetrating his boot.

Offensive operations involving mechanised infantry in Vietnam were based on the search-and-destroy (i.e. cordon and search) principle and were carried out in company with tanks, both artillery and air support being on call if required. Once contact with the enemy was obtained, mobility was employed to sever his escape routes. A mounted sweep through the area would follow, with appropriate fire support, the object being to locate the enemy's bunkers, detonate his mines and booby traps, flatten his *panjis* and disorganise his resistance. Finally, tanks and dismounted infantry would sweep the area again, eliminating the last survivors. If, at any phase, the enemy chose to break contact, he would be contained and killed by the troops manning the stop-line.

It is worth mentioning, albeit briefly, that many of these same problems now confront the Soviet





The M113 series remains the most numerous APC in Bundeswehr service. Here 'friendly' and 'hostile' forces are seen passing the same point during an exercise. Markings, from left to right as viewed, are the formation insignia, over the bridge classification; Bundeswehr serial number with national flag prefix; unit tactical insignia; and on hull sides, national cross and unit vehicle number. (Bundesministerium)

Panzergrenadiers going into action from their Marder APC/IFV. Though undoubtedly formidable, the Marder is too tall and too heavy for its task, and its maintenance and reliability factors compare with those of a tank rather than an APC. (Bundesministerium)

Army in Afghanistan. Solutions, however, are not easily come by, for mountain warfare has its own rules. The APC has only a limited application and the helicopter gunship does not provide a complete answer. All the signs suggest that the Kabul government and its Russian allies are now entangled in an internal security situation which Afghan historical experience confirms is incapable of a long-term military solution.

The focus of post-war mechanised infantry attention, naturally, has remained fixed on the potential European battlefield. Within the battle-group long term relationships between tank and mechanised infantry units, down to squadron/company level, have led each to a mutual understanding of the other's capabilities and limitations, while constant practice together has bred a series of instinctive reactions which will enable the team to function even when subjected to communications jamming.

Nonetheless, there are areas in which debate continues, not least over the question as to whether mounted or dismounted action is preferable. American mechanised infantry units place less emphasis on mounted action than they did in the Vietnam era; the British discourage it; the Bundeswehr's Panzergrenadiers are enthusiastic about it; the Russians, while making every provision for it, still practice leaving their APCs 500–1,000 metres short of the objective and advancing on foot behind a tank screen. In these circumstances, therefore, it is worth considering the thoughts of Brig. Richard Simpkin, author of Brassey's *Mechanised Infantry*: 'I at least have yet to find an example in which the use of personal weapons while mounted in their vehicles by the men of a *large* infantry force was taken into account in the planning of an operation, let alone became a battle winning factor. Likewise, I find it hard to envisage such situations.'

Likewise, the appearance of the MICV/IFV class of vehicles has not been accepted without reservation in some quarters. Tank and infantry officers alike are emphatic that an APC is not a tank and cannot perform a tank's functions. The danger exists that hard-pressed commanders will seek to use them as tanks, a course of action which would result in sorry consequences for all concerned. It will always be necessary to remember that whether or not an APC is armed with armour-defeating weapons, its first and most important function is to transport the infantryman into combat; and, as already stated, the function of the infantryman is *to close with and kill his enemy*. To this, in the world of the mechanised infantryman, all other tasks must be subordinate.

The Plates

Research by Bryan Perrett, Martin Windrow and Simon Dunstan

A1: Berliet VUDB armoured patrol vehicle, 6ᵉ Escadron, 1ᵉʳ Régiment Étranger de Cavalerie; Morocco, 1930–34

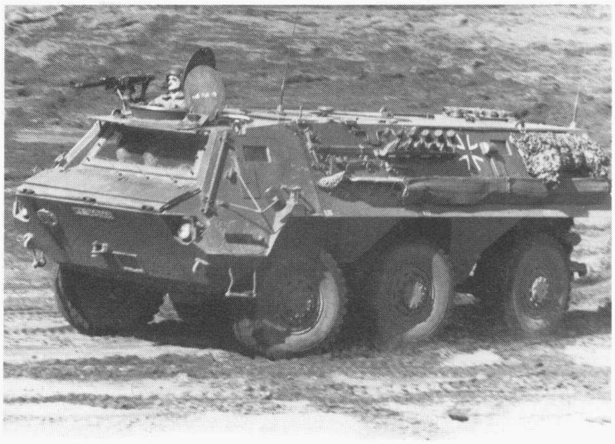
Primarily an armoured car unit, this squadron of the Foreign Legion cavalry saw a good deal of action during the final penetration of southern Morocco. The need for a more flexible tactical response led to the acquisition of this very early example of a purpose-built APC—or 'IFV', given its armoured ports for riflemen along the rear hull. Fifty of these four-wheel-drive vehicles, officially classified as a '*voiture de prise de contact*', were built in 1930; the Belgian Army bought 12 of them. They each carried a driver and two or three mounted infantry, armed with rifles, grenades, and a dismountable FM1924/29 light machine gun firing through the port beside the driver. Note that the roof opened in three armoured flaps. Finished in sand-coloured paint, the Berliet displays the Legion's green seven-flame grenade on the front of the cab; a serial in regulation French style on the hull side stowage bin and below the radiator louvres; and the squadron badge (inset) forward on the hull sides.

A2: Universal Carrier, Soviet Army, 1943

Although the USSR consistently plays down the contribution to the Soviet war effort made by Lend-Lease shipments of all kinds, a large number of armoured vehicles were supplied. While it is fair to say that with the exception of the Sherman most of the tanks supplied were inferior to the local product, Russia's lack of armoured personnel carriers would suggest that the few units to receive imported designs were probably extremely grateful. They were issued to reconnaissance and other supporting units rather than to motorised infantry; and this painting is taken from one of a number of photos showing Soviet use of the Universal Carrier. This example mounts a Boys anti-tank rifle and a Bren, removed here from its anti-aircraft mount. The driver's position appears to have been roofed over. There are no markings apart from white distance-keeping flashes on the fenders, and Cyrillic shipping instructions still visible on the hull side.

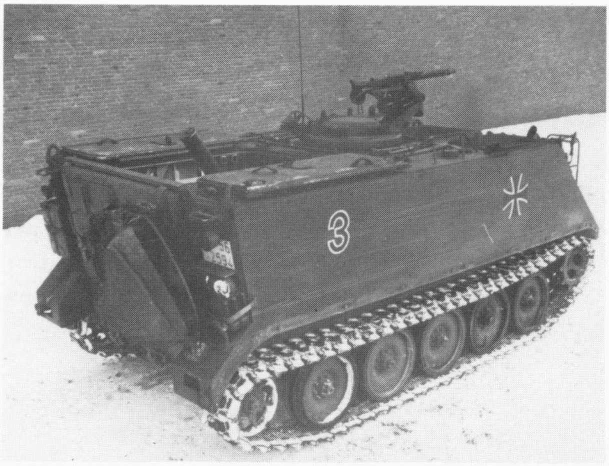
B1: SdKfz 251/1 Ausf.D, 5.SS-Panzer-Division 'Wiking'; Vistula Front, Poland, summer 1944

The Ausführung D was the last major version of Germany's classic SdKfz 251 half-track series; it appeared in 1943, and some 10,600 vehicles were built, in nearly 20 specialised configurations. This is the basic 251/1 APC vehicle, the standard Panzergrenadier transport in armoured infantry battalions in the second half of the war. It differed from the earlier Ausf.A, B and C models in having a much simplified hull design for easier mass production. (See Vanguard 32, *The SdKfz 251 Half-Track*.)



The Bundeswehr's *Transportpanzer* is a six-wheeled APC with an impressive turn of speed and good cross-country performance. (Bundesministerium)

This vehicle was photographed during the operations of the crack SS-Panzer-Division 'Wiking' in Poland in July/August 1944. It is finished in the dull yellow factory paint scheme used for all



The M125A1 mortar carrier version of the M113 seen in Bundeswehr service, and with 'everything hanging out'. Note the turntable baseplate. (Bundesministerium, FMC)

German armour from mid-1943, with a random mottling of dark brown sprayed over at unit level. The side and rear tactical numbers followed the sequence used for tank turret numbers from mid-1944 onwards: this is therefore the second APC of the four vehicles in the second platoon of the second company of its battalion. We may assume that at least the first battalion of the senior infantry regiment of this crack division would have received APCs; this may therefore be a vehicle of 1.Btl., SS-Panzergrenadier-Regiment 9 'Germania'. Photos suggest that the numbers are black with white trim; red with or without white trim was also used. The divisional sign (inset) is stencilled in white to the left of the rear doors.

B2: Buffalo Mk IV (LVT-4), C Sqn., 11th Royal Tank Regiment, 79th Armoured Division; Holland, October 1944

Photographed during the assault on South Beveland by 52nd (Lowland) Div. on 25 October, this Buffalo is finished in its original US Army Olive Drab, rather weathered. The markings on the ramp, left to right as viewed, are the 79th Armd. Div. sign (inset); the red circle of C Sqn. around the white '4' Troop number; and the white '67' on a red square, the regimental tactical code of 11 RTR 'left over' from its days as a conventional gun tank regiment. Squadron and troop markings are repeated on the hull side, with a crudely hand-painted vehicle tactical number '29' and vehicle name SLOUGH—all the regiment's Buffaloes had names beginning with 'S'.

C1: 'Crabe' (M29C Weasel) of French 1erGroupement Autonome (1erREC); Annam, 1952

C2: 'Alligator' (LVT-4) of one of the two Groupements Autonomes (1erREC); Annam or Tonkin, early 1950s

The amphibious cargo carrier M29C, '*Crabe*' to the French in Indo-China, was tried out as a reconnaissance vehicle in flooded areas by French counter-insurgency forces in December 1947. Initial problems were overcome, and several squadrons were formed from légionnaires of the 1st Foreign Cavalry Regiment, 1er REC; with light machine guns and even recoilless rifles mounted, the little vehicles paid dividends when hunting the Vietminh into their sanctuaries, such as the Plain of Reeds west of Saigon. Their inability to carry infantry to exploit a contact ceased to be a drawback from 1950 onwards when the LVT '*Alligator*' became available. By late 1951 two *Groupements Autonomes* were operating, the 1er GA in the Mekong Delta and the 2eGA in the Red River Delta of Tonkin. Each comprised two 33-vehicle squadrons of '*Crabes*'; three squadrons each of 11 LVT-4s carrying infantry, usually Vietnamese; and a support platoon of six LVT(A)-4s. The classic organisation, from 1953, was two redesignated *Groupements Amphibies* each of three pairs of squadrons: one with three five-vehicle '*Crabe*' platoons, mostly armed with Browning .30cal. or

Graduates of the Kirov Military Academy in Leningrad take part in a winter exercise with BMPs. Cramped, uncomfortable, and a danger to its own crew, the BMP has been given many qualities desirable in an IFV at the expense of the 'human engineering factor'. (Novosti)

7.5mm FM1924/29 machine guns but including some 57mm recoilless rifles and a 60mm mortar; and one with eight LVTs—four troop transports, two LVT(A)-4 fire support tracks, a command and a recovery track. The '*Alligators*' usually mounted two .50cal. and two .30cal. MGs, and sometimes a 75mm recoilless rifle. Of the total of 12 squadrons, ten were drawn from 1er REC.

The 1er REC vehicle insignia, a shield in the Foreign Legion cavalry's red, green and blue with a Legion seven-flame grenade and unit number in white, appears on the port quarter of both vehicles. The insignia of both GAs was a similar shield in Legion red and green with a white motif combining the grenade and a crab, bearing the relevant number on its shell; this was usually painted on the starboard quarter, but was sometimes replaced by sub-unit insignia such as the entirely unofficial *Peloton Obusier* device shown on the inset of the LVT(A)-4 turret. An alternative was the badge shown on the right hand patch, seen on '*Crabes*' of the 1er Escadron, 1er REC. Vehicle names were sometimes seen on the '*Alligators*', e.g. JAFFA illustrated, but were almost unknown on '*Crabes*'. Serials, typically in the form of a small tricolour followed by 'IC-' and a five-digit group in yellow, were usually painted on the bow and stern of the M29C, and at the rear of the LVT hull sides. At least one photo shows an LVT(A)-4 of 17e Escadron, 1er REC during Operation '*Camargue*' in July 1953 with a large white '8' on the turret side in place of an insignia. Finally, note that the upper bow plate of the M29C was almost invariably loosened off and swung up and back, the centre being bent down for better visibility.

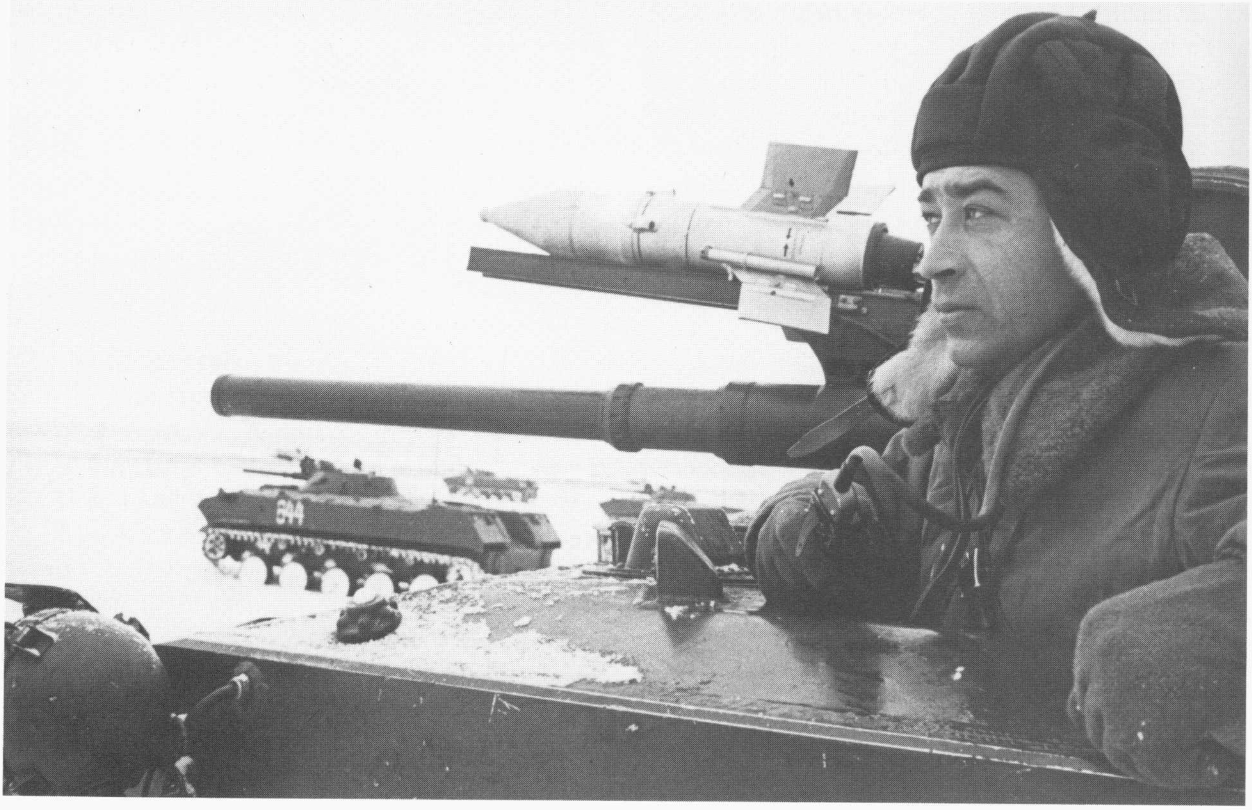
D1: M3A1 Armored Personnel Carrier, French 2e Zouaves; Moulay Ismael, Algeria, 1957

A typical example of the use of the ubiquitous US half-track by counter-insurgency forces the world over. Its effectiveness was governed by terrain. In open country where 'hot pursuit' across country was attempted, it was obviously valuable, as it provided protection against small arms and a mobile automatic weapon mount. In thick jungle or mountainous terrain it was more or less limited to roads, where it was vulnerable to mining and to plunging fire.

The 2e Zouaves were an infantry regiment motorised for service against the ALN. Their equipment was a mixture of winch- and roller-fitted half-tracks, finished in dark French Army green; serials in typical French style displayed a tricolour followed by white Cyrillic numerals on a black strip, across the top edge of the radiator on roller-equipped vehicles (e.g. '82900') and on the centre of the front fender on winch tracks (e.g. '821682'). A black category number on a white grenade was painted on the bottom of the doors; the regimental badge, (inset) was painted full-colour on the front of the .50cal. MG pulpit; and some vehicles carried a small red pennant with the regiment's number over a crescent in gold.

D2, D3: Humber FV1611 'Pig', 19 Company, Royal Corps of Transport; Belfast, 1981

Vehicles and drivers from the RCT are provided for the infantry battalions during their tours of duty in Ulster; this vehicle was assigned to 2nd Bn., Scots Guards. Basic finish is all-over British Army matt dark green, with various roughly-painted flashes of white and red for visibility and distance-keeping. Markings include the RCT's blue and yellow flash on the left rear hull, high up; the unofficial battleaxe



The BMD is the Soviet Airborne Forces' version of the Motor Rifle troops' BMP, and is similarly armed, a Sagger ATGW being mounted on a launching rail above the smooth-bore 73mm gun. Reloading the missile projector under fire would involve dangerous crew exposure.

insignia of 19 Co. on the doors (inset); and roughly painted white vehicle numbers, here '74', on the inside of the doors, and on the roof for helicopter visibility (inset). All door handles, inside and out, are painted red for instant visibility. Note red wheel-nuts.

The Pig's advantages as an urban security vehicle are discussed in the text. Its disadvantages include very poor visibility, as it is always driven 'closed up' when tactical, and this leads to fairly frequent minor accidents. The local 'bad guys' often concentrate their missiles on the vision blocks in the hope of forcing the driver to open his visor. The upper rear hull flap is sometimes kept open for the use of the riflemen in the rear, but improvised bulkheads are often installed behind the cab crew to prevent their injury by 'enfilade' fire.

E1: BTR-152 V1 armoured personnel carrier, Syrian 17th Mechanised Brigade; Golan Heights, 1967

From photos of this vehicle, knocked out in the June War of that year and still visible *in situ* the following year. The all-over Soviet forest green was relieved only by a crudely stencilled white insignia on both hull sides, showing the Syrian eagle between palm branches within a double broken ring. The starboard end of the front fender bore a white serial in the usual Arab style on a brighter green background.

E2: 'Crocodile' armoured personnel carrier, Rhodesian Armoured Corps; Mozambique, October 1979

Photos suggest that this home-made APC was based on a 10-ton truck chassis. Some show a continuous line to the armoured rear hull, but photos of this vehicle carrying troops of the Selous Scouts into Mozambique during Operation 'Miracle' in October 1979 show the rear hull sides cut down, with pintle mountings for light machine guns fitted, and a metal 'sill' added, as here. Twin GPMGs are mounted above the cab. The Crocodile was one of a number of improvised armoured vehicles used by the Rhodesian Armoured Corps during the war;

others included a ten-man IFV named the 'Bullet', and a bizarre-looking but apparently effective anti-mine vehicle named the 'Kudu'. Normal finish was camouflage of matt dark green and sand. Occasionally the red and yellow diagonally divided square flash of the RAC was painted on front and rear surfaces. This vehicle has only station-keeping rear fender stripes, and chalked tactical numbers for this particular operation on the rear door.

F1: M113 ACAV, 1st Platoon, Troop B, 1/10th Cavalry; Vietnam, 1971

The 1st Sqn. of the US Army's 10th Cavalry served in Vietnam attached to the 4th Infantry Division between September 1966 and November 1971. This M113 was photographed near Pleiku in the Central Highlands, II Corps Tactical Zone, in the latter year. It has the 'A Model' Armored Cavalry Assault Vehicle kit produced by the FMC Corporation: front hatch armour and gunshield for the .50cal. machine gun, and pintle mounts and gunshields for the additional M60s on each side of the rear hatch. Partial unit codes are visible on the front 'bumpers': in full they would read '4-1 10 CAV', for the division and regiment, and 'B-18' for the troop and vehicle. The individual APC number '18', in Troop B's identifying white, is repeated aft on the hull side in front of the traditional red and white cavalry guidon. Personal markings added by the crew are 'N.F' over a scroll forward of the serial on the hull side, and 'GRUNT' on the front trimvane floatation pod.

F2: M113 ACAV, Troop A, 1/4th Cavalry; Vietnam, 1967

The 1st Sqn., 4th Cavalry was attached to the US 1st Infantry Division in Vietnam between October 1965 and April 1970; this track was photographed during Operation 'Cedar Falls' in the 'Iron Triangle' in III CTZ north-west of Saigon in January 1967. It has what appears to be the 'B Model' ACAV kit comprising front hatch armour and .50cal. gunshield only. Serial and 'bumper codes' follow the same pattern as F1 above; and the crew have added a winged skull with a halo and the name 'ANGELIQUE D'MORTE', apparently in yellow. The oddly-translated 'Angel of Death' may have survived intact, for all we know; for interest we have added to the rear hull the typical spalling effect of an RPG hit, gouging the aluminium armour in concentric scabs and scars. Note that this earlier vehicle lacks the floatation kit fitted to F1 above.

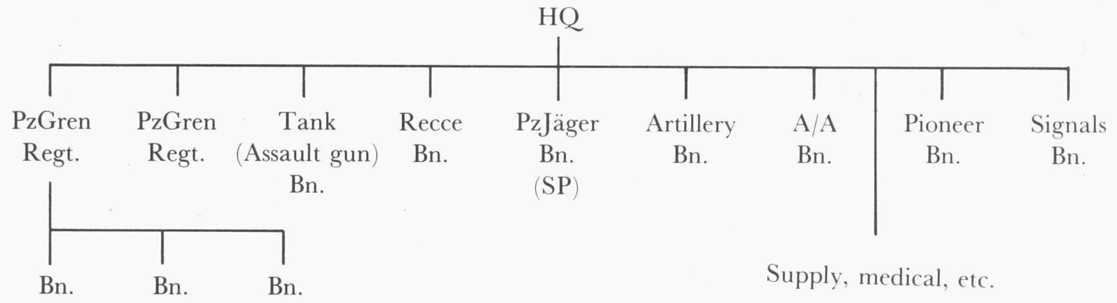
G1: AMX-VTT, Régiment de Marche du Tchad, French 2^eDivision Blindée, c.1980

The regiments of the French 2nd Armoured Division keep the titles they bore in 1944 when this famous formation liberated Paris. The armoured infantry component is still known, anomalous as the title has become with the ending of France's African empire, as the 'Tchad March Regiment'. ('Régiment de marche' in French Army usage indicates a 'task force' unit drawn from static garrisons and detached for a particular campaign away from its normal depot.) The insignia of the old wartime 2^eDB is still used: a blue and white map of France charged with a Cross of Lorraine. The 'cog-wheel' appearance of the presentation on this AMX-VTT is caused by the bolts round the edge of the circular plate. The name LE BOURGET identifies the vehicle; the only other markings are a bridge plate, black '15' on yellow, and standard serials.

G2: LVTP-7, Argentine 1st Amphibious Vehicles Battalion, 2nd Fleet Marine Force; Stanley, East Falkland Island, 2 April 1982

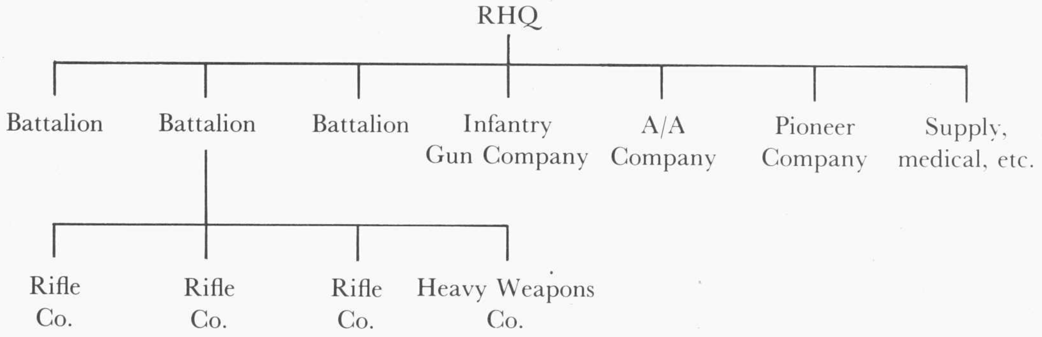
This unit, one of those which spearheaded the Argentine invasion of the Falklands, was equipped with at least 16 LVTP-7s and 15 LARC-5s. The

The US Army's Armored Infantry Fighting Vehicle (AIFV) mounts a 25mm cannon and a 7.62mm co-axial machine gun; with a maximum speed of 38mph, it carries a crew of three as well as a seven-man infantry section. (FMC)



Panzergrenadier Division, September 1943

HQ
PzGren Regt.
PzGren Regt.
Tank (Assault gun) Bn.
Recce Bn.
PzJäger Bn. (SP)
Artillery Bn.
A/A Bn.
Pioneer Bn.
Signals Bn.
Bn.
Bn.
Bn.
Supply, medical, etc.



Panzergrenadier Regiment of Panzergrenadier Div., September 1943

RHQ
Battalion
Battalion
Battalion
Infantry Gun Company
A/A Company
Pioneer Company
Supply, medical, etc.
Rifle Co.
Rifle Co.
Rifle Co.
Heavy Weapons Co.

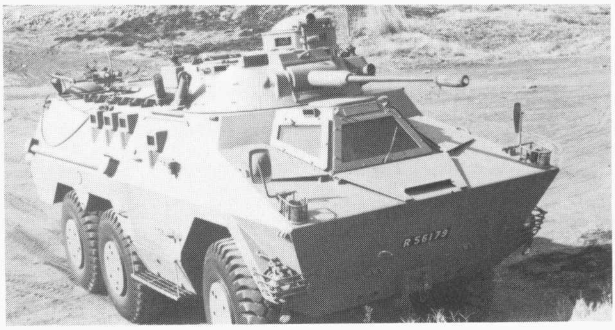
Note: The Panzer Division of this date also contained two Panzergrenadier regiments, but of two battalions each. One regiment was classified as 'armoured', since *one* of its battalions was theoretically equipped with APCs, and sometimes each battalion had a handful. The second, 'motorised' regiment had no APCs at all.

LVTPs landed at about 0630 on the morning of 2 April, on the York Bay beach south of the old airstrip at Stanley. No. 2 Section of the 67-man Royal Marine garrison managed to delay their advance briefly; and Marines Gibbs, Best and Brown put a round of 66mm and one of 84mm A/T rockets into one vehicle, which stopped, and from which nobody emerged. The LVTP-7 carries a full section of infantry, so British estimates of total Argentine casualties that night of five dead and 17 wounded may well be conservative. The vehicle illustrated was photographed in the streets of Stanley after the British surrender. At one time the commandant of the Argentine Marine Corps, Brig.Gen. Carlos Busser, is believed to have ridden in it. Markings on the overall dark green finish were limited to a small presentation of the national flag above the navy's anchor, sun and Phrygian cap emblem in white and pale blue, painted on the hull side level with the 12.7mm turret; and yellow tactical numbers on the sides of the bow and on the rear ramp (inset). The guidon (inset) was flown from the radio aerial; it is as yet unidentified.

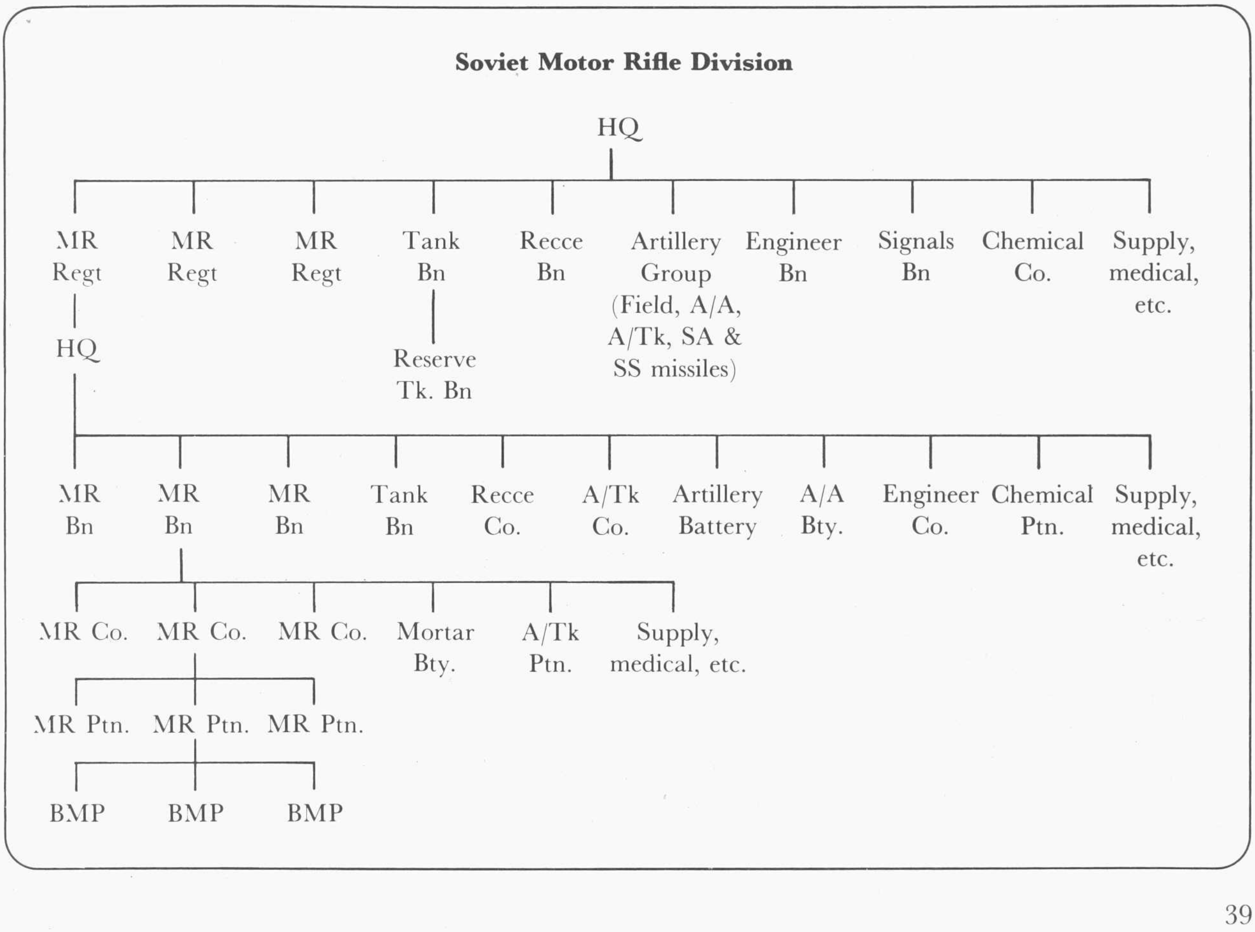
H1: BTR-60PB amphibious armoured personnel carrier of a Soviet Marine Infantry Brigade, 1970s

The USSR is believed to attach a brigade of marines to each Fleet of the Red Navy. They are equipped and trained almost identically to Motor Rifle troops, apart from their amphibious landing vehicles. This APC is finished in the usual Soviet forest green. Markings are limited to a painted presentation of the naval ensign on the trim vane and on the forward hull side hatch; and a tactical number '174' on the turret sides. Normal Red Army practice would make this the fourth vehicle of the seventh company in the first battalion—an impossibility, since there are only three companies in a Soviet battalion; so we must assume a different sequence in Marine units.

H2: BMD-1 airborne armoured personnel carrier, Soviet 105th Guards Airborne Division; Afghanistan, 1982
This APC was photographed in Kabul in the winter of 1981/82. Finished in forest green, it bears the Soviet Airborne Troops insignia on the glacis and aft on the hull sides; the tactical number '370', indicating the commander of the seventh company in the third battalion of a regiment; and an unexplained 'diamond-2' marking.



The South African Ratel series of IFVs and support vehicles are impressive for several reasons. Main versions are the Ratel 20, as here, which mounts a 20mm cannon and two MGs and carries a four-man crew and seven riflemen; and Ratel 60 and 90, which have two-man turrets mounting respectively a 60mm mortar and a 90mm gun, with a slight penalty in infantry capacity due to ammunition stowage. All have a good 'mine survivability' factor built in; and given the importance of crew comfort on long tropical approach marches, the standard of air conditioning, noise suppression, and personal space is high. Note the numerous optical devices, and the driver's excellent field of vision. Despite these strengths, combat experience suggests the limitations of the IFV concept. An account of SADF Battle Group 61's Operation 'Sceptic' against SWAPO bases in Angola in June 1980, published by the uniquely well-informed South African defence journalist Willem Steenkamp in his *Borderstrike!* (Butterworths, 1983), paints a frightening picture of disorientation among mechanised infantry attempting to fight through even moderate opposition in thick country while 'closed down'. (C. Foss)



Soviet Motor Rifle Division

HQ
MR Regt
MR Regt
MR Regt
Tank Bn
Recce Bn
Artillery Group (Field, A/A, A/Tk, SA & SS missiles)
Engineer Bn
Signals Bn
Chemical Co.
Supply, medical, etc.
HQ
Reserve Tk. Bn
MR Bn
MR Bn
MR Bn
Tank Bn
Recce Co.
A/Tk Co.
Artillery Battery
A/A Bty.
Engineer Co.
Chemical Ptn.
Supply, medical, etc.
MR Co.
MR Co.
MR Co.
Mortar Bty.
A/Tk Ptn.
Supply, medical, etc.
MR Ptn.
MR Ptn.
MR Ptn.
BMP
BMP
BMP

Notes sur les planches en couleur

A1 Un des tout premiers véhicules blindés de transport de troupe dont 50 véhicules de ce modèle ont été construits. L'insigne présentant une grenade verte identifie la Légion Etrangère; l'écusson qui se trouve sur le côté de la coque est celui du 6ème Escadron, 1er Régiment Etranger de Cavalerie.

A2 L'URSS a distribué les véhicules blindés de transport de troupe fournis par les Alliés non pas aux unités d'infanterie motorisée, mais aux troupes de soutien comme les unités de reconnaissance. Les armes britanniques d'origine sont encore montées sur cet exemple: il s'agit d'un fusil antichar *Boys* et d'une mitrailleuse légère *Bren*.

B1 La dernière version importante de la série *SdKfz 251* a été l'*Ausf. D.*, dont la conception a été simplifiée afin de faciliter la production en série. Le colori sur cet exemple est le jaune sombre qui fut appliqué par les usines à partir de 1943 et recouvert d'un camouflage brun. L'insigne de la division est placé sur l'arrière de la caisse à gauche de la porte; les numéros suivent la même séquence que celle untilisée sur les tourelles de char—deuxième véhicule, deuxième peloton, deuxième compagnie du bataillon. **B2** On peut voir sur ce *Buffalo* l'insigne de tête de taureau de la 79ème Division Blindée, le cercle rouge de l'escadron C, et le chiffre blanc de la *4 Troop*; le nom et le numéro '29' identifient le véhicule individuel.

C1 L'insigne placé sur le côté gauche à l'avant est celui du *1er REC*, et celui qui se trouve du côté droit est celui du *Groupement Autonome*. **C2** On donnait rarement un nom aux M29C, par contre les LVT en portait souvent un. '*Jaffa*' porte aussi l'insigne du *1er REC*. Le détail sur la gravure montre la tourelle d'un LVT(A)-4 portant l'insigne non officiel d'un *Peloton Obusier*.

D1 Notez l'écusson de régiment des *2ème Zouaves* peint en couleur sur la tourelle de la mitrailleuse. **D2, D3** Le carré jaune et bleu placé à l'arrière de la coque identifie le *Royal Corps of Transport* opérant ces vèhicules et les fournissant avec leur chauffeur, aux bataillons d'infanterie postés dans les différentes zones pendant une période de quatre mois chacun. On peut voir sur les portes l'insigne non officiel de *19 Company*, *RCT*. Ce '*Pig*' a servi avec le *2nd Bn.*, *Scots Guards*.

E1 L'insigne blanc peint grossièrement et figurant un aigle national syrien et des branches de palmier à l'intérieur d'un cercle double, est la seule marque mis à part le numéro de série placé sur le pare-choc. **E2** Ce véhicule de transport de troupe a été fabriqué de façon 'artisanale' à partir du châssis d'un 10 tonnes et ne porte que des numéros temporaires de convoi inscrits à la craie sur la porte: il a été utilisé lors de l'Opération '*Miracle*', une attaque à l'intérieur de la Mozambique, par les *Selous Scouts*.

F1 Si les numéros inscrits sur les garde-chenilles étaient complets, ils se liraient '4–1' (*4ème Division d'Infanterie*), '10 CAV' (*10ème Régiment de Cavalerie*), 'B-18' (*Troupe B*, véhicule 18). '*Grunt*' est le nom ajouté par l'équipage et signifiant 'le Grogneur', qui était le surnom donné au soldat d'infanterie pendant la guerre du Vietnam. **F2** Ce M113 est équipé du nécessaire de modification 'Modèle B' le moins complet, seule l'ouverture de mitrailleuse est blindée. Notez les dommages caractéristiques infligés par une grenade de lance-fusées.

G1 Le nom identifie le véhicule individuel; l'insigne est celui de la *2ème Division Blindée*. **G2** Les numéros inscrits en jaune identifiaient les vehicules individuels de cette unité; la marque du drapeau national était peinte sur tous ainsi que l'insigne de l'ancre de la marine. Le drapeau qui flotte sur l'antenne n'a pas été identifié.

H1 Les marques se limitent au drapeau de la marine soviétique, peint sur l'avant et le côté de la coque, et à un numéro sur la tourelle qui semble indiquer que les unités de la marine utilisent une séquence différente de celle trouvée sur les véhicules de l'armée. **H2** Notez l'insigne des forces aeroportées soviétiques placé sur l'avant et le côté de la coque.

Farbtafeln

A1 Ein sehr frühes Beispiel für einen bewaffneten Mannschaftstransportwagen, von dem 50 Exemplare gebaut wurden. Das grüne Granatenabzeichen identifiziert die Fremdenlegion; das Abzeichen auf der Seite der Karosserie steht für *6e Escadron*, *1er Régiment Etranger de Cavalerie* (6. Schwadron des 1. Kavallerieregiments der Fremdenlegion). **A2** Die USSR gab die von den Alliierten ausgegebenen bewaffneten Mannschaftstransportwagen nicht an motorisierte Infanterieeinheiten, sondern an Hilfseinheiten wie die Aufklärungstruppen. Dieses Exemplar trägt noch die ursprünglichen britischen Waffen: ein *Boys* Panzerabwehr-Gewehr und ein leichtes *Bren MG*.

B1 Die letzte wichtige Ausführung der SdKfz 251 Serie war die Ausf. D, eine vereinfachte Konstruktion für leichte Massenproduktion. Das Muster auf diesem Exemplar ist das übliche dumpfe Gelb, das seit 1943 von den Fabriken mit brauner Kamouflage versehen wurde. Das Divisionsabzeichen ist auf der hinteren Karosserieplatte links von der Tür; die Zahlen haben dieselbe Reihenfolge wie auf den Panzerkanzeln—zweites Fahrzeug, zweiter Zug, zweite Kompanie des Bataillons. **B2** Dieser 'Buffalo' hat das Stierkopfabzeichen der 79. Panzer Division, den roten Kreis des C-Schwadron und die weisse Zahl der 4-Zug; der Name und die Zahl '29' identifizieren das individuelle Fahrzeug.

C1 Das Abzeichen auf der linken Bogenseite ist das des *1^{er} REC*, und das auf der rechten gehört zum *Groupement Autonome*. **C2** Die M29C trug selten Namen, die LVT dagegen häufiger. '*Jaffa*' hat ebenfalls das Abzeichen des *1^{er} REC*. Die Detailzeichnung zeigt die Kanzel eines LVT(A)-4 mit den inoffiziellen Insignien eines *Peloton Obusier*.

D1 Man beachte das Regimentsabzeichen der *2^{e} Zouaves* in vollen Farbeb auf dem MG—Lauf. **D2, D3** Das gelbe und blaue Quadrat auf der hinteren Karosserie identifiziert das *Royal Corps of Transport*, das diese Fahrzeuge und ihre Fahrer zu den verschiedenen, für vier Monate in bestimmten Gebieten stationierten Infanteriebataillonen schickt. Die Türen tragen das inoffizielle Abzeichen für *19 Company*, *RCT*. Dieses Fahrzeug 'Pig' diente beim *2nd Bn*, *Scots Guards*.

E1 Die grob gestanzten weissen Insignien mit dem syrischen Adler und Palmzweigen in einem doppelten Ring sind die einzigen Markierungen, abgesehen von der Seriennummer auf der Stossstange. **E2** Dieser selbstgebaute Mannschaftstransportwagen ist auf dem Fahrgestellt eines 10 ton LKW gebaut und hat lediglich mit Kriede auf die Tür gemalte provisorische Konvoy-Nummern; er wurde von dem *Selous Scouts* bei der *Operation 'Miracle'*, einem Angriff in Mozambique, benutzt.

F1 Die Zahlen auf dem Kettenschutz bedeuten: '4–1'—*4th Infantry Division*, '10 CAV'—*10th Cavalry Regiment*, 'B-18'—*Troop B*, Fahrzeug 18. '*Grunt*' ist ein von der Mannschaft gewählter Name und bedeutet 'Grunzer', der Spitzname für einen Infanteriesoldaten währened des Vietnamkriegs. **F2** Dieser M113 hat die weniger umfangreiche 'Model B' Ausrüstung mit einer Bewaffnung nur für die vordere MG-Luke. Man beachte den typischen Schaden durch eine Raketengranate.

G1 Der Name identifiziert das individuelle Fahrzeug, die Insignien die *2^{e} Division Blindée*. **G2** Gelbe Zahlen identifizierten die individuellen Fahrzeuge dieser Einheit; alle trugen die gemalten Nationalflaggen und das Ankerabzeichen der Marine. Die Flagge an der Antenne konnte nicht identifiziert werden.

H1 Die Markierungen sind beschränkt auf die sowjetische Marinefahne, die vorne und auf den Seiten der Karosserie aufgemalt ist, und eine Zahl auf der Kanzel, die offenbar anzeigt, dass Marineeinheiten eine andere Reihenfolge benutzen als bei den Armeefahrzeugen beobachtet. **H2** Man beachte die Abzeichen der sowjetischen Fallschirmtruppe auf dem Bug und der Seite der Karosserie.

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Mit Aufzeichnungen auf deutsch uber die Farbtafeln

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(3) **US 1st Infantry Division 1939–45**
(4) **Fallschirmpanzerdivision 'Hermann Goring'**
(6) **The Lee/Grant Tanks in British Service**
(8) **US 1st Marine Division 1941–45**
(9) **British Guards Armoured Division 1941–45**
(11) **US 2nd Armored Division 1940–45**
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